



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

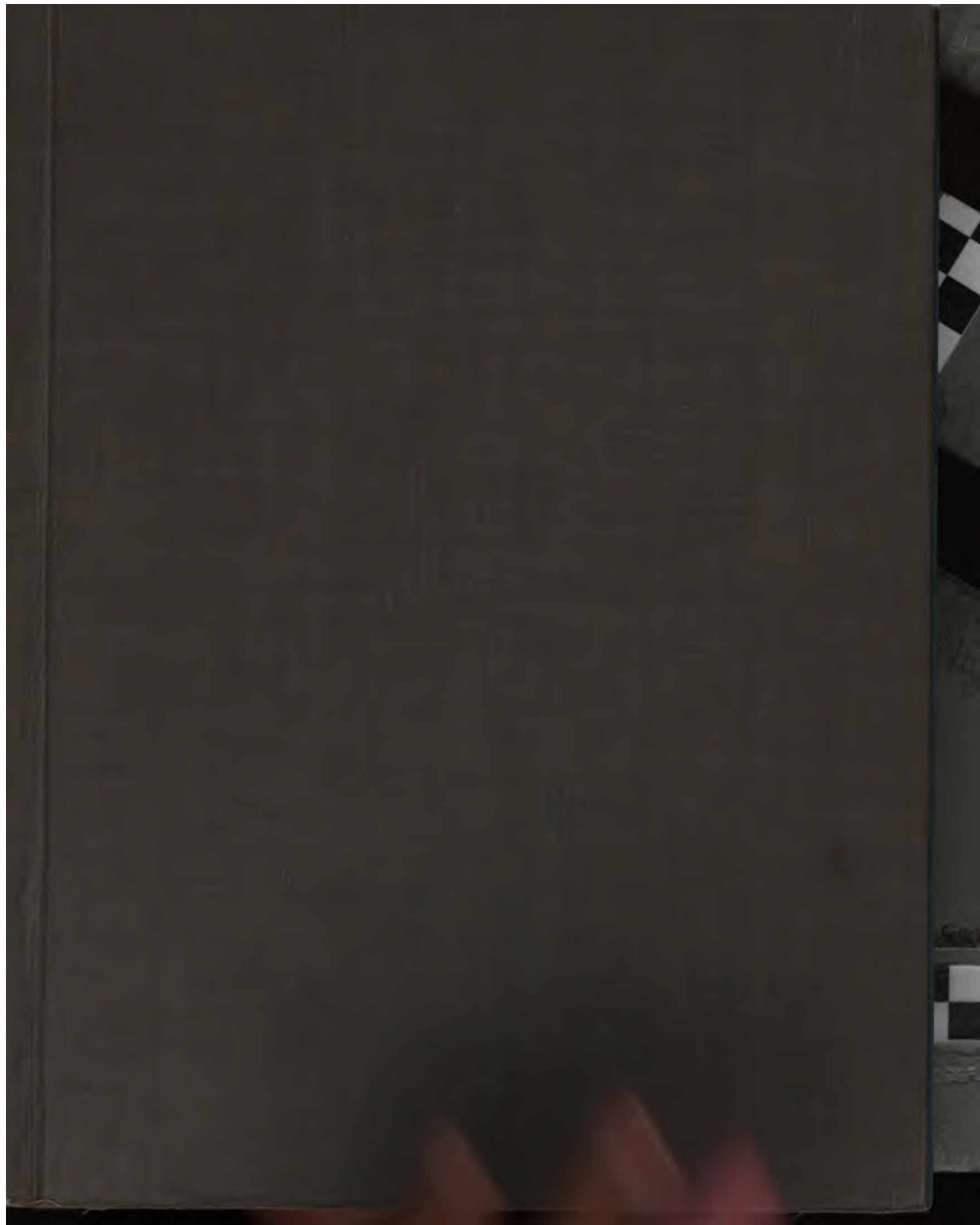
Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>



B925i



**THE
JAMES PERRIN SMITH
LIBRARY OF
CEPHALOPODA
PRESENTED
1932**

From the Author

Owing to ill-health and change of residence, there has been some irregularity in sending out the parts of this volume. Any failure in the sequence the Author will be pleased to rectify, so far as is possible, if it be notified to him.

S. S. BUCKMAN

Towersey, Thame,
January, 1908.



THE
PALÆONTOGRAPHICAL SOCIETY.

INSTITUTED MDCCCXLVII.

LONDON:

MDCCCLXXXVII—MDCCCXVII.

AMMONITES OF THE "INFERIOR OOLITE SERIES."

NOTE.

Owing to the length of the Monograph of the Ammonites of the "Inferior Oolite Series," two Title-pages are issued so that the Text and the Plates may be bound in two separate volumes. Five leaves of corrections of names in Explanations of Plates are prefaced to the Atlas.

ORDER OF BINDING AND DATES OF PUBLICATION.

PAGES.	PLATES.	ISSUED IN VOL. FOR YEAR.	PUBLISHED.
Title-pages and Preface	Corrections in Names	1907	December, 1907
1— 24	I—VI	1886	March, 1887
25— 56	VII—XIV	1887	January, 1888
57—144	XV—XXIII and A	1888	March, 1889
145—244	XXIV—XXXVI	1889	March, 1890
245—256	XXXVII—XLIV	1890	April, 1891
257—312	XLV—LVI	1891	February, 1892
313—344	LVII—LXXVI	1892	November, 1892
345—376	LXXVII—XCII	1893	December, 1893
377—456	XCI—CIII	1894	November, 1894
Suppl. i—xxxii	Suppl. I—IV	1898	December, 1898
„ xxxiii—lxiv	„ V—XIV	1899	December, 1899
„ lxv—clxviii	„ XV—XIX	1904	December, 1904
„ clxix—ccviii	„ XX—XXIV	1905	November, 1905
„ ccix—ccx }	—	1907	December, 1907
Index, cxi—cclxii }			

A MONOGRAPH
OF THE
AMMONITES
OF THE
“INFERIOR OOLITE SERIES”

(STAGES—TOARCIAN, PARS; AALENIAN; BAJOCIAN;
BATHONIAN, PARS)

BY
S. S. BUCKMAN, F.G.S.,
HON. MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY, OF THE CHELTENHAM NATURAL SCIENCE SOCIETY, ETC.

VOL. I. ATLAS.
PLATES I—CIII, AND A; SUPPLEMENT, PLATES I—XXIV.

HILDOCERATIDÆ, PLATES I—XXXVII, AND A; SUPPL., PLATES I—XXIII.
POLYMORPHIDÆ, PLATES XXX, XXXVII, XXXIX—XLVIII; SUPPL., PLATES XXIII, XXIV.
ARIETIDÆ, PLATE XXXVIII.
AMALTHEIDÆ (SONNININÆ), PLATES XXII, XXIII, XLVIII—CIII.
OPPELIDÆ, PLATES XX, XXI.

LONDON:
PRINTED FOR THE PALÆONTOGRAPHICAL SOCIETY.

1887—1907.

S^{rs}

217

THEORY OF THE EARTH AND ITS HISTORY.

1.

CORRECTIONS OF NAMES IN EXPLANATIONS OF PLATES.

The corrections are marked by broad-faced type = **Welschia**.

The references to pages where the correction is made follow the name. The Arabic numerals refer to the main work; the small Roman to the Supplement.

Where no author's name is appended, the writer of this Monograph is the giver of the trivial appellation.

PLATE I.

Murchisonæ hemera.

Welschia obtusifomis, p. li.

PLATE II.

[Murchisonæ hemera.]

FIGS.

3, 4. **Strophogyria pinax**, p. lxiii.

[Concavi hemera.]

6, 7. **Ludwigella concava** (J. Sowerby), p. lxxxvi.

About drawing of Fig. 7 see p. 62.

PLATE III.

[Murchisonæ hemera.]

3. **Ludwigina patula**, p. lxi.

4, 5. **Ludwigia tuberculata**, p. lxix.

[Bradfordensis hemera.]

6, 7. **Brasilina Baylii**, p. lxxxiii.

PLATE IV.

Concavi hemera.

1, 2. **Ludwigella arcitenens**, p. lxxxv.

3, 4. **Ludwigella cornu**, p. lxxxv.

Bradfordensis hemera.

5, 6. **Brasilia bradfordensis**, p. lxxx.

7. **Hyattina** ? sp., p. cxxx.

8. **Apedogyria platychora**, p. lx.

PLATE V.

Bradfordensis hemera.

Apedogyria platychora, p. lx.

PLATE VI.

Concavi hemera.

Lucya magna, p. lxxvi.

PLATE VII.

Bradfordensis hemera.

FIGS

1, 2. **Ludwigia ambigua**, p. lxxii.

3, 4. **Brasilia effricata**, p. lxxxii.

[Discitæ hemera.]

5, 6. **Braunsella lenis**, p. cii.

Bradfordensis hemera.

7. **Ancolioceras costatum**, p. xlviii.

PLATE VIII.

[Concavi hemera.]

1, 2. **Ludwigella concava** (J. Sowerby), p. lxxxvi.

Discitæ hemera.

3, 4. **Graphoceras decorum**, p. xcvi.

5, 6. **Brasilia sublineata**, p. lxxx.

7, 8. **Graphoceras flaccidum**, p. xcvi.

PLATE IX.

1—4. **Lucya cavata**, p. lxxvi.

5, 6. **Graphoceras stigmatosum**, p. xcvi.

7. **Graphoceras limitatum**, p. xcvi.

8—10. **Graphoceras stigmatosum** (abnormal), p. xcvi.

PLATE X.

1, 2. **Depaceras formosum**, p. lxxix.

3, 4. **Brasilia pulchra**, p. lxxxi.

5, 6. **Graphoceras v-scriptum**, p. xcvi.

7, 8. **Graphoceras limitatum**, p. xcvi.

9. **Graphoceras undulatum**, p. xcvi.

10, 11. **Platygraphoceras apertum**, p. xciv.

CORRECTIONS OF NAMES

PLATE XI.

Bradfordensis hemera.

Figs.

1. *Wiltshireia gigantea*, p. lxviii.

Discitæ hemera.

- 2, 3. *Reynesia intermedia*, p. ciii.
4, 5. *Reynesia lepida*, p. civ.
6, 7. *Reynesia laxa*, p. ciii.

PLATE XII.

- 1—3. *Brasilia pinguis*, p. lxxxi.
4. *Wiltshireia gigantea*, p. lxviii.
5—7. *Welschia pagana*, p. lii.
8, 9. *Brasilia decipiens*, p. lxxxii.
10, 11. *Darellia semicostata*, p. cxiii.

PLATE XIII.

- 1—3. *Cypholloceras opaliniforme*, p. xlv.
4, 5. *Canavarina* sp., p. cxliii.
6. *Lioceras striatum*, p. xlii.
7—10. *Walkeria subglabra*, p. cxli.
11. *Lioceras partitum*, p. xxxix.
12. *Lioceras striatum*, p. xlii.

PLATE XIV.

- 1, 2. *Lioceras* sp., p. xlii.
3, 4. *Lioceras partitum*, p. xxxix.
5, 6. *Cypholloceras plicatum* ?, p. cxxx.
7—9. *Cypholloceras renovatum*, p. xlvi.
10, 11. *Deploceras fallax*, p. lxxviii.

PLATE XV

- 1, 2. *Brasilia similis*, p. lxxxii.
3, 4. *Platygraphoceras compactum*, p. xcv.
5, 6. *Pseudographoceras* ? *compressum*, p. xciii.
7, 8. *Braunsina* ? *futilis*, p. ci.
9, 10. *Platygraphoceras* sp. A., p. xciv.
11—13. *Ludwigella rudis*, p. lxxxv.
14, 15. *Ludwigella subrudis*, p. lxxxvii.
16, 17. *Braunsina* ? *angulifera*, p. ci.

PLATE XVI.

- 1, 2. *Toxolloceras Walkeri*, p. cxvi.
3, 6. *Darellia* ? *polita*, p. cxiv.
7, 9. *Reynesella piodes*, p. cix.
10, 11. *Reynesia coela*, p. civ.
12, 13. *Hyperlioceras discitiforme*, p. cxxiv.

PLATE XVII.

Figs.

- 1, 2. *Hyperlioceras liodiscites*, p. cxxv.
3, 4. *Hyperlioceras rudidiscites*, p. cxxiv.
5. *Hyperlioceras subleve*, p. cxxiii.

PLATE XVIII.

- 1, 2. *Hyperlioceras rudidiscites*, p. cxxiv.
3. *Hyperlioceras subleve*, p. cxxiii.
4, 5. *Darellia lævis*, p. cxiii.

PLATE XIX.

- 1, 2. *Hyperlioceras deflexum*, p. cxxii.
3, 4. *Deltotoceras subsectum*, p. cxxi.
5, 6. *Deltoidoceras subdiscoideum*, p. cxviii.

PLATE XX.

- 1, 2. *Deltoidoceras subdiscoideum*, p. cxviii.
3, 4. *Pseudolloceras gradatum*, p. clviii.
5, 6. *Pseudolloceras pumilum*, p. clx.
9, 10. *Pseudolloceras replicatum*, p. clx.
11, 12. *Lioceras subcostosum*, p. xxxvii.
13, 14. *Ecotraustes nodifer*, p. cxv.
15—17. *Ecotraustes costiger*, p. cxiv.

PLATE XXI.

- 3, 4. *Hyperlioceras Lucyi*, p. cxxiii.
5, 6. *Dissoroceras tabulatum*, p. cxv.
7—9. *Deploceras fallax*, p. lxxviii.
10, 11. *Lucya caduceifera*, p. lxxv.

PLATE XXII.

- 30, 31. *Hildoceras semipolitum*, p. clvi.
32, 33. *Sonninia sulcata*, p. cxcii.
34. *Sonninia aff. Buckmani* (Haug.), p. cxcii.
35, 36. *Brodiceras curvum*, pp. xxxii, xxxiii.

PLATE XXIII.

Sauzei hemera.

1. *Sonninia sulcata*, p. cxcii.

[*Witchelliae hemera.*]

- 2, 3. *Witchellia* sp., p. cxcii.

Sauzei hemera.

- 5, 6. *Sonninia dundriensis*, p. cxcii.

- 7, 8. *Sonninia aff. Buckmani* (Haug.), p. cxcii.

Variabilis hemera.

- 9, 10. *Brodiceras* ? *Witchelli*, p. xxxiii.

- 11—13. *Haugia jugosa*, p. xxv.

- 14, 15. *Haugia grandis*, p. xxvi.

- 16, 17. *Phymatoceras Dumortieri*, p. xxx.

Artists, and all who have assisted in the production of this volume, and to all who have in so many ways kindly rendered services, scientific or technical, in connection with this work and its associated studies, the writer cordially expresses his most grateful thanks.

With this work the author desires to associate three names—that of the late Dr. Thomas Davidson, F.R.S., one of his earliest geological friends, from whom he experienced much kindness and encouragement; that of Mr. R. D. S. Darell, F.L.S., F.G.S., formerly Mr. Darell Stephens, one of his earliest companions in the field, from whom he received many practical lessons in the zonal distribution of Ammonites (what the immense collection formed by Mr. Darell's enthusiastic labours has added to our knowledge of Ammonites is partly shown in these pages and plates); and that of his late father, Prof. James Buckman, from whom the author received so many scientific lessons, and to whom he owes his taste for scientific work. It was the father's great desire that his son should undertake the describing of the Inferior Oolite Ammonites—a task which he himself had formerly hoped to achieve.

Finally, the author desires to dedicate this work to his wife, his companion in many geological excursions, to whose skill he owes a number of good specimens. These words are written in the month which sees the completion of twenty-five years of married life, and the receipt of the many kind congratulations incidental to a silver wedding.

TOWERSEY, BUCKINGHAMSHIRE

(UNDER THAME);

June 17th, 1907.

CORRECTIONS OF NAMES

PLATE A.

Figs.

2. *Ludwigia tuberculata*, p. lxix.
5. *Lucya caduceifera*, p. lxxv.
7. *Ludwigella rudis*, p. lxxxv.
9. *Ecotraustes costiger*, p. exciv.
11. *Ancolloceras costatum*, p. xlviii.
12. *Wiltshireia gigantea*, p. lxxviii.
13. *Brasilia similis*, p. lxxxii.
16. *Graphoceras v-scriptum*, p. xcvi.
17. *Platygraphoceras compactum*, p. xcvi.
19. *Graphoceras undulatum*, p. xcvi.
21. *Graphoceras v-scriptum*, p. xcvi.
24. *Toxolloceras Walkeri*, p. cxxvi.
25. *Hyperlioceras deflexum*, p. cxxii.
28. *Hildoceras semipolitum*, p. clvi.
36. *Phymatoceras Dumortieri*, p. xxx.

PLATE XXIV.

Haugia grandis, p. xxvi.

PLATE XXV.

1. *Haugia grandis*, p. xxvi.
2. *Haugia aff. variabilis*, p. xxiii.
- 5, 6. *Haugia ? inæqua*, p. xxix.
7. *Haugia ? fascigera*, p. xxix.

PLATE XXVI.

- 1, 2. *Haugia sculpta*, p. xxix.
- 3—5. *Haugia aff. illustris*, p. xxvii.

PLATE XXVII.

- 3—6. *Phlyseogrammoceras Orbignyi*, p. clv.

PLATE XXVIII.

- 4—6. *Grammoceras audax*, p. cxxxii.
- 14, 15. *Pseudogrammoceras explicatum*, p. cxlvi.
- 16, 17. *Grammoceras penestriatulum*, p. cxxxii.
- 20, 21. *Canavarella ? arenacea*, p. cxxxix.

PLATE XXIX.

- 1—5. *Pseudogrammoceras ? doerntense*
(Denckm.), p. cliii.
- 6, 7. *Pseudogrammoceras ? sp.*, p. cliv.
- 8—10. *Pseudogrammoceras ? placidum*, p. cliii.

PLATE XXX.

Figs.

- 1, 2. *Canavarina folleata*, p. cxli.
- 3, 4. *Pleydellia ? mactra ?* (Dum.), p. cxxxix.
- 5—7. *Cotteswoldia limatula*, p. cxxxiv.
- 8, 9. *Walkeria ? lotharingica ?* (Branco), p. cxl.
10. *Walkeria ? sp.*, p. cxl.
- 11, 12. *Pleydellia sp., A.*, p. cxxxviii.
- 13, 14. *Pleydellia ? subcompta ?* (Branco), p. cxxxviii.
- 15—17. *Dumortieria linearis*, p. clxxxiii.
18. *Dumortieria subfasciata*, p. clxxxii.
19. *Dumortieria subexcentrica*, p. clxxxii.

PLATE XXXI.

- 1, 2. *Pleydellia fluens*, p. cxxxvii.
- 3, 4. *Cotteswoldia crinita*, p. cxxxvii.
- 5, 6. *Canavarina venustula*, p. cxliii.
- 7—9. *Pleydellia ? sp. B.*, p. cxxxix.
- 10—12. *Canavarina venustula*, p. cxliii.
- 13, 14. *Cotteswoldia sp.*, p. cxxxv.
- 15, 16. *Cotteswoldia misera*, p. cxxxv.

PLATE XXXII.

- 1, 2. *Cotteswoldia superba*, p. cxxxiv.
- 3—6. *Pleydellia aalensis* (Ziet.), p. cxxxvii.
- 7, 8. *Cotteswoldia subcandida*, p. cxxxv.
- 9, 10. *Walkeria burtonensis*, p. cxxxix.
- 11, 12. *Walkeria arcuata*, p. cxxxix.

PLATE XXXIII.

- 1, 2. *Cotteswoldia distans*, p. cxxxvi.
- 3, 4. *Cotteswoldia costulata* (Ziet.), p. cxxxiii.
- 5—10. *Pleydellia leura*, p. cxxxviii.
- 11, 12. *Pseudogrammoceras ? placidum*, p. cliii.
- 13—16. *Asthenoceras nannodes*, p. xlix.
- 17, 18. *Pseudogrammoceras subfallaciosum*, p. cxlvii.

PLATE XXXIV.

- 1, 2. *Pseudogrammoceras pachu*, p. cli.
- 3—5. *Pseudogrammoceras Bingmanni*
(Denckm.), p. cxlv.
- 6, 7. *Pseudogrammoceras aff. quadratum*
(Haug), p. cxliv.
- 8, 9. *Pseudogrammoceras Muelleri* (Denckm.),
p. cli.
- 10, 11. *Pseudogrammoceras expeditum*, p. cxlviii.
12. *Grammoceras sp. A.*, p. cxxxi.

INDEX

Heavy type marks accepted species, their figures and technical descriptions. *Italic type* shows names, etc., revised. Roman type denotes casual mention of species, etc., and all general matter. A * marks a species foreign to the scope of the monograph, geographically, geologically, or technically. Species are indexed under trivial names, but listed under generic. Species casually mentioned in articles which describe others of the same genus have seldom been indexed.

- aalense*, *Grammoceras*, Pl. 31, figs. 15, 16, see *misera*, *Cotteswoldia*; Pl. 32, figs. 1, 2, *superba*, C.; Pl. 32, figs. 3-6, *aalense*, *Pleydellia*; Pl. 32, figs. 7, 8, *subcandida*, *Cotteswoldia*; Pl. 32, figs. 9, 10, *burtonensis*, *Walkeria*; p. 192, see spp. var. above
- aalense*, *Grammoceras*, 44, 54, 222, 227, 244, cxxxiv, cxxxv, cxxxvii, cxxxix
- aalense*, *Harpoceras*, 37, 176, 192, 197, 253, 255, clxxxii; analysis of species so named, 193
- aalense* type, species of the, xxxv
- aalensis*, *Ammonites*, 12, 28, 37, 54, 62, 127, 178, 182, 184, 192, 194, 197, 198, 248, cxli
- cf. *aalensis*, *Ammonites*, 259
- Aalensis* *hemera*, vi, xxxv; strata of, xxxv, ccviii
- aalensis*, *Ludwigia*, 190, 192
- aalensis*, *Pleydellia*, Pl. 32, figs. 3-6; p. 192 (*Grammoceras aalense*); Suppl., Figs. 112, 113, p. clxv; p. cxxxvii
- aalensis*, *Pleydellia*, *hemera*, ccv
- aalensis* *costula*, *Ammonites*, 237, 238
- Aalenian* stage, ccv
- Abnormal form, 75; specimen, xcvi; variation, 289
- Abnormalities of septa, 381
- Abnormality, hypostrophic, xcvi
- abnormis*, *Sonninia*, Pl. 85, figs. 4-6; pp. 377, 387, 404
- Absorption of living chamber, 312
- acanthodes*, *Sonninia*, Pls. 58, 59, 60, 63, fig. 1; Pl. 100, fig. 8; pp. 319, 390, 419; 301, 317, 318
- Acanthodes*-stock, differential characters of, 331
- Acanthopleuroceras*, clxix
- Acme*, 357; and *Inferior Oolite*, cxcix: of genetic series, cc; genetic, cc; morphogenetic, ccii
- actæon*, *Ammonites*, 14; *Harpoceras*, 13
- acutum*, *Arietoceras* (*hemera*), ccv; *Grammoceras*, 163
- acutus*, *Ammonites*, 24
- Additional species, clxi
- adicrum*, *Harpoceras*, 346, 347; *Hammatoceras*, 13
- Adult characters of *S. zigzag*, 272
- Ægoceras*, 14, 129; *belcheri*, *intermedium*, *liasicum*
- Ægoceratidæ*, 14, 16, 127, 287
- Ægoceratinæ*, 14
- affine, *Pelecoceras*, 175
- affinis, *Ammonites*, 228, 229
- affinis, *Hudlestonia*, Pl. 38, figs. 1-8; p. 228
- Affinity, criteria of, i
- Agassiceras*; striaries, *miserabile*
- Age of specimen, causing difference in description, xciv
- Ages, ccv
- agria*, *Strophogyria*, Suppl., Fig. 19 in text, p. lxii
- Alderley*, xxviii
- algovianus*, *Ammonites*, 127, 132
- alsaticum*, *Harpoceras*, 304
- alternata*, *Sonninia*, Pl. 76, figs. 7-9; Pl. 77, figs. 3-5; Pl. 103, fig. 7; pp. 348, 390, 424
- Alticarina*, iv
- Alticarinate*, cvi; (series), cxix
- Alum-shale*, 168, 175, 203
- Alum Shales*, above, and *variabilis*, ccix
- Amaltheen*, 287

CORRECTIONS OF NAMES

PLATE LXV.

Figs.

- 3, 4. *Sonninia reclinans*, p. 421.
6, 7. *Fontannesia curvata*, p. clxxxix.

PLATE LXVII.

- 1, 2. *Sonninia aff. dominans*, p. 438.
3, 5. *Sonninia sp.*, p. 438.

PLATE LXIX.

Sonninia dominica, p. 410.

PLATE LXXIV.

- 4—6. *Sonninia spinifera*, p. 418.

PLATE LXXVII.

- 6—9. *Sonninia subirregularis*, p. 426.

PLATE LXXXV.

Figs.

- 7, 8. *Sonninia obtusifomis*?, p. 430.

PLATE LXXXVIII.

4. *Sonninia subirregularis*, p. 426.

PLATE CIII.

Fig. 2 at bottom of plate should be Fig. 24.

SUPPLEMENT, PLATE II.

In the footnote, for "spines" read "species."

SUPPLEMENT, PLATE IV.

- 7—9. *Brodiceras junctum*.

SUPPLEMENT, PLATE X.

- 35—37. *Brasilina Tutcheri*?, p. cxxx.

- armatus, Ammonites, iii; group, 314
 armipotens, Kiliania, Suppl., Fig. 23, p. lxv
 Arniocheras, 170, 226, 280
 Arrested development, specimen showing, li, lxxiv
 Ascending series, 200, 207
 aspera, Braunsina, Suppl., Pl. 17, figs. 13-15, p. xcix
 aspera, Denckmannia, Suppl., p. xxi
 Association of characters, cciv
 Astarte, 45, 46
 Asterocheras, 280; obtusum
 Asthenocheras, p. xlix; nannodes
 Asthenocheras, classification, cxviii
 astrictum, Deltoidocheras, Suppl., Fig. 79, p. clxv, Fig. 81, p. cxviii
 Asymmetry of lobes, considered, 382
 Atavic senility, 357
 Atavism, 265, 280, 301
 attenuata, Ludwigella, Suppl., Pl. 19, figs. 10-12; p. xxxvii
 attenuatum, Pelecocheras, 225
 attracta, Ludwigella, Suppl., Pl. 19, figs. 31-33; p. lxxxvii
 attrita, Cotteswoldia, Suppl., Pl. 23, figs. 12-14; p. cxxxiv
 attrita, Sonninia, Pl. 90, figs. 4-6; pp. 371, 387, 408
 audax, Grammocheras, Pl. 28, figs. 4-6, p. 169 (Grammocheras toarcense); Fig. 104, p. clxv; p. cxxxii
 Auricles, spatulate, 455; lateral, Fontannesia, clxxxix
 aurita, Fontannesia, Suppl., Pl. 24, fig. 7; p. cxc
 Auxology, terms of, 357
 Aveyron, 208, 215, 220, cxlviii, cxlix
 Axial terminal lobule, 364
 Axis of bulla, iii
 Babylon Hill, section at, 5; Vacek's remarks on, notice of, 96; fossils from, labelled as Yeovil, 97
 Baculites, 14, ccii
 Bajocian, of Normandy, 63; of Toulon, 294; stage, ccv
 bajociana, Ceromya, 48
 Bajocien, 173
 Band, partition, 81, xvi
 Barnes Batch, strata of, ccvi
 Barrington, near Ilminster, Somerset, xxii, xxxii
 Basin, Dorset-Somerset, 249; Paris, 249; Anglo-Parisian, 452; Rhone, xiii
 Batcombe, cxlvi
 Bath, 173, 175, clxix, clxxxv; strata of, ccviii
 Bather, Dr. F. A., on terms of Auxology, 357
 Bathonian stage, ccv
 Bayani, Ammonites, 109, vi, xii, xxxii
 Bayani group, xxxi
 Bayani, Lillia, 109
 Bayle, E., 13, 17, 18, 35, 108, 146, 148, 155, 156, 158, 170, 176, 190, 192, 204, 206, 207, 227, 238, 287, 313, 450, vii, xiii, xxii, xxiii, lix, lxxi, cxxxii, cxlvii, clii, cliii, clxxxii; on Ludwigia, 16; and Am. Murchisonæ, lxix
 Bayle & Coquand, 255, 258, 453, clxxxiii
 Baylii, Brasilina, Pl. 3, figs. 6, 7, p. 18 (Ludwigia Murchisonæ var. Baylii); Suppl., Pl. 11, fig. 34; p. lxxxiii.
 Baylii, Ludwigia, 18
 Beaminster, 19, 23, 25, 26, 376, xlviii, li, lix, lx, lxiii, lxiv, lxix, lxxxii, xcvi, ci
 Bed (beds), ammonite, ammonitiferous, blue iron-shot, bottom, brachiopod, cadomensis, cephalopod, concavum, conglomerate, coral, coralline, dew, dispansum, Dumortieria, ferruginous, fossil, ironshot, Leda-ovum, limestone, lower, marl, Moorei, navis (Trigonia), nodular, opalinum, opalinus, ornatus, parkinsoni, paving, phillipsiana, pisolite, plant, red, ringens, sand, sandy ferruginous, striatulum, subdecorata, upper, variabilis, wild, Witchellia, zigzag
 Bed, see Beds, Bett, Zone
 Beds, note on term, 166; ironshot, date of, ccviii
 Beecher, C. E., Brachiopoda, cxcix
 Belcheri, Ægoceras, 232
 Belemnites, 45-47
 belophora, Canavarella, Suppl., Pl. 22, figs. 22-24; Fig. 100, p. clxv; p. cxxxix
 Benecke, Prof. E. W., 273, clv
 benigna, Reynesia, Suppl., Pl. 22, figs. 10-12; p. cv
 Berlin Museum, cxii
 Berne, 62
 Besançon, cxlix
 Bett, jurensis, torulosus, 2
 Beyrichi, Ammonites, 87

THE
PALÆONTOGRAPHICAL SOCIETY.

INSTITUTED MDCCCXLVII.

LONDON:

MDCCCLXXXVII—MDCCCXVII.

- bradfordense, *Lioceras*, lxviii, lxxx, cxxx
bradfordense, var. *giganteum*, *Lioceras*, Pl. 11, fig. 1, Pl. 12, fig. 4, see *gigantea*, *Wiltshireia*; Pl. 12, figs. 5-7, *pagana*, *Welschia*; p. 25, see spp. above
bradfordensis, *Brasilina*, Pl. 4, figs. 5, 6, p. 22 (*Lioceras bradfordense*); *Suppl.* Pl. 17, fig. 28; **Fig 39 in text**, p. lxxx
bradfordensis, *Brasilina*, hemera, ccv
Bradfordensis hemera, vi; strata of, ccvii
Braikenridgii, *Ammonites*, 455; *Stephanoceras*, 120
Branco, Dr. E. W., 169, 170, 176, 179, 182, 189, 190, 196, 197, 198, 227, 230, 238, 243, 246, 248, 250, 254, 255, 258, 259, 262, 279, cxxxviii, clxxvii, clxxxi, clxxxvi; on Dogger, 4; on *A. subserrodens*, 180; on *Harpoceras lotharingicum*, 199; and *H. subundulatum*, 244, 260; and *Am. Moorei*, 256; and *Amaltheus subserrodens*, clxiii
brancoi, *Dumortieria*, Pl. 45, figs. 8, 9, p. 259 (*D. subundulata*); p. clxxxvi
Brasil, Dr. L., xliii, l, lv, lvii, lix, lxviii, lxx, lxxi, lxxii, lxxiv, cxliv, cxlviii, cxlix, clxxi, clxxii, clxxiii, clxxiv, cxcii
brasili, *Hyattina*, *Suppl.*, Pl. 13, figs. 7, 8; **Fig. 14 in text**, p. lvii
Brasilina, *Suppl.*, p. lxxx; *bradfordensis*, *effricata*, *decipiens*, *pinguis*, *pulchra*, *similis*, *sublineata*
Brasilina, classification, cxviii; from *Brasilina*, lxxxiii
Brasilina, *Suppl.* p. lxxxiii; *baylii*, *crinalis*, *tutcheri*
Brasilina, from *Ludwigella*, lxxxiv; classification, cxviii
Brauner Jura, 3
Brauns, 228, 229, 278, 306
Braunsella, *Suppl.*, p. cii; *lenis*, *rotabilis*, *semi-lenis*
Braunsella from *Reynesia*, ciii; classification, cxviii
Braunsia, cii; see *Braunsella*; *lenis*
Braunsina, *Suppl.*, p. xcix; *angulifera*, *aspera*, *contorta*, *cornigera*, *elegantula*, *fastigata*, *futilis*, *projecta*, *subquadrata*
Braunsina, classification, cxviii
Breakheart Hill, 279, xxix
bredonensis, *Denckmannia*, *Suppl.*, p. clxi
Brephe, 357
brevispinata, *Sonninia*, Pl. 75, figs. 6-8; pp. 343, 388, 414
Bridport, 61, 251, xxiii, xxiv, lviii; strata of, ccvi, ccviii
Bridport Sands, clxxxvii; and *Dumortieria*; and opalinoid ammonites, clxxxiii; strata of, ccviii
Bristol, 103, clxix
Bristol Museum, 61, 63, lvi
British Association Committee and Hybrid names, 276; and generic names, 284
British Museum, 60, 62, 146, 174, 175, 212, 256
Broad Windsor, 26, 51, 61, 275, 399, 401, lxiv, lxviii, lxxiv, lxxxiii, cx, clxxi; limestone beds at top of so-called Inferior Oolite, v; strata of, ccvi, ccvii
Brockhampton Quarry, lxvi
Brodia, a genus of fossil insects, xxxiii
Brodie, Rev. P. B., and *Brodieia*, xxxi
Brodiceras, *Suppl.*, pp. xii, xxxi (*Brodieia*), xxxiii; *curvum*, *junctum*, *witchelli*
Brodiceras, classification, cxviii
Brodieia, *Stephanoceras*, 272
Brodieia, *Suppl.*, pp. xii, xxxi, see *Brodiceras*; *curva*, *juncta*, *witchelli*
Brodieia, replaced by *Brodiceras*, xxxiii
Brongniarti, *Sphaeroceras*, 120
Bronn, H. G., 188
Bronni, *Ammonites*, 268, 283
Bronni, *Polymorphites*, 234
Bronni, *Posidonomya*, zone of, 50, 51
Brunswick, 88
Buch, L. von, vii
Buckholt Wood, 173, 179, 183, 188, 194, 197, 208, 210, 213, 240, 242, 245, 251, 252, 258, cxxix, cxxx, cxxxiii, cxxxiv, cxxxvi, cxlxx, clxi, clxix, clxxv, clxxviii, clxxxi, clxxxvi, clxxxvii; section, 164
Bucklandi, *Ammonites*, xvii
Buckman, James, 20, 68, 113, 246, 304, 306, 335, cxc; Lias and Oolite division, 3
[Buckman, J.] papers by, referred to, 65, 71, 91, 113, 305, c
Buckman, S. S., 17, 20, 22, 25, 37, 38, 56, 117, 192, 225, 255, 262, 273, 275, 300, 304, 313, 317, 319, 341, 395; on terms of Auxology, 357; and Wilson, E., vi

- [Buckman, S.] papers by, referred to, 8, 25, 26, 38, 50, 91, 120, 164, 167, 173, 213, 223, 250, 274, 288, 299, 314, 347, 359, 378, 447, 451, 456, v, lviii, cliv
- Buckmani-grit, date of, ccvii
- aff. *buckmani*, *Sonninia*, Pl. 23, figs. 7, 8, Pl. 22, fig. 34, p. 107 (*Sonninia*, sp.); p. cxci
- Buckman's (Prof.) quarry, 335
- Bugstone, date of, ccvii
- Building Freestone, 7; date of, ccvii
- Building stone, meaning of, ccix; date of, ccvii, ccviii
- Bulla, 353, 405; axis of, iii
- Bullicostæ, 350, 353
- Bullicostate, 405
- bullatum, *Stephanoceras*, 312
- bullifera, *Hyattia*, Suppl., Pl. 14, figs. 1, 2; p. lv
- Bulk, acme of, individual, cc
- Bulk-decline, cciii
- Bulk-development, acme of, cc
- Burton Bradstock, 19, 40, 41, 52, 55, 56, 194, 274, xxxvi, xliii, lxxii-lxxxiv, xc, cxxiv, cxxvi, cxxix, cxxxviii, cxl, cxlii, clxx, cxcv; section at, 47; correlation, 166; sands at, 51; strata of, ccvii; cliff, 102
- burtonensis*, *Walkeria*, Pl. 32, figs. 9, 10, p. 192 (*Grammoceras aalense*); Suppl., p. cxxxix
- cadomensis*, *Ammonites*, 117, 120
- Cadomensis*-beds, 119
- caduceifera*, *Lucya*, Pl. 21, figs. 10, 11; Pl. A, fig. 5; p. 104 (*Ludwigia Lucyi*); Suppl., Fig. 30 in text, p. lxxv
- Caduceiform radial line, p. lxxiv
- caducifera*, *Lucya*, p. lxxv
- callosa*, *Ludwigella*, Suppl., Pl. 19, figs. 16-18, p. lxxxviii
- Caloceras*, 232, 233, 236, 267, 289, 290; and *Arietidæ*, 233; liassicum
- Calvados*, lvii, lix, lxviii, lxxii, lxxiv
- Cam Down*, 41, 158, 204, 208, 231, 239, 251, 253, xxviii, cli, clxxiv, clxxv, clxxviii, clxxix, clxxx, clxxxvi, clxxxvii
- camura*, *Sonninia*, Pl. 99, figs. 4-6; pp. 386, 403
- Canaliculati*, 132
- canaliculatum*, *Harpoceras*, 13
- canaliculatus*, *Ammonites*, 127, 129
- Canaries, 454
- Canavarella*, p. cxxviii; *arenacea*, *belophora*, *sceleta*, *toma*
- Canavarella*, classification, cxcviii
- Canavari*, Prof. Mario, and specimens of *Lillia*, 109; and *Canavarina*, cxli
- Canavaria*, cxli, see *Canavarina*; *folleata*, *venustula*
- Canavarina*, p. cxli; *digna*, *folleata*, sp., *steinmanni*, *venustula*
- Canavarina*, classification, cxcviii
- candidus*, *Ammonites*, 28, 192, cxxxvii
- Cap San Vigilio, 54, 295, 298; absence of *Sonninia* from, 316
- capellinus jurensis*, *Ammonites*, 215
- capillatum*, *Grammoceras*, 163
- capricornum*, *Liparoceras*, 289
- carbatinum*, *Platygraphoceras*, Suppl., Pl. 20, figs. 16-18; p. xciv
- Carina*, iv; solid, 81, iv; Oppel's mistake concerning, 156; false, 205; appearance of, in development, 290; crenulate, 295; false, example of, 296; development, 299; lettering referring to, explanation of, 308; hollow character lost with age, 325; disappearance of, in age, 352; decline of, hypostrophic, lxxii; relative size of, as a distinction, cv; terms of, cvi; old age affecting, cvi; degenerate form of hollow, clv; when developed, in *Hildoceratidæ*, in *Polymorphidæ*, clxix; want of, clxxi
- Carina* (hollow), 81, iv, clv; in classification, 82; works dealing with, 83; cause of mistakes, 156; infilling of, restored, 205; degenerate form of, clv
- Carina*, see also *alticarina*, *non-septicarina*, *parvicarina*, *septicarina*
- Carina* variable (series), cxii
- carinata*, *Fontannesia*, Pl. 47, figs. 13, 14, p. 262 (*Dumortieria grammoceroïdes*); p. clxxxix
- carinata*, *Ludwigella*, Suppl., Pl. 19, figs. 40-42, p. xc
- carinata*, *Waldheimia*, 5
- Carinate*, see *alticarinata*, *distincticarinata*, *parvicarinata*, *parvicarinata*, *subalticarinata*
- Carinate* series (*Fontannesia*), clxxxix
- Carinate-bisulcate*, iv
- Carinati-* and *levigati-tabulate*, cv

- Carinati-convex; -sulcate, iv
 Carinati-tabulate, iv; (series), cv; periphery, cv
cariniferum, *Ancolloceras*, Suppl., Pl. 11, figs. 7-9; p. xlvii
cariniferum, *Pseudographoceras*?, Suppl., Pl. 20, figs. 13-15, p. xciii
carusensis, *Ammonites*, 232
casta, *Ludwigella*, Suppl., Pl. 20, figs. 31-33; p. lxxxix
 Catabatic, 357
 Catagenesis, 289, excix, cc, ccii, cciii
 Catagenesis, gerontic, effect on suture line, cxvii
 Catagenetic, characters, cc; species, latumbilicate, cliv; stage, clxix
 Cataplasis, 357
 Catullia, 276
 Catullo and Catulloceras, 276
Catulloceras, p. clxxi; *aratum*, *dumortieri*, *insignisimile*, *leesbergi*, **macrum*, *meneghinii*, *perroudi*, *psamminum*, *subaratum*, *scissum*, *vernose*
Catulloceras, clxix; geological position of, 235; literature on, 236; from allies, 267; classification, cxviii
caumonti, *Parkinsonia*, ontogeny of, 271
cavata, *Lucya*, Pl. 9, figs. 1-4, p. 68 (*Lioceras* *concavum* var. *v-scriptum*); Suppl., Pl. 15, fig. 20, p. lxxvi
 Cells, interlobular, 373
 Central Apennines, 220, xviii
 Cephalopod bed, xii, xvi, xxxv; meaning of term, ccix; date of, ccviii: (Cotteswold) five Ammonite faunas in; not a case of rapid entombment; contemporaneous with several hundred feet of deposit elsewhere, 447
 Cephalopod shells, remarks concerning distribution, etc., of, 456
 Cephalopoda bed, 7, 42; sections, 43-46; Ramsay's statement about thickness of, 49; greatest development of, 49; of Gloucestershire and Dorset district, 97; Upper Lias, 175
 Chalford, xxvi, xxvii; strata of, ccix
 Chamber, living, absorption of, 312
 Chambers, painted, 380
 Chapuis & Dewalque, 60, 146, 170, 184, 189, 241, vii, xxiii
 Characters, association of, cciv; and morphogeny, cc; of *Ammonites*, excix; of *S. zigzag*, 272
 Chartron, C., cxxxiv, clxxviii, clxxx; and *Chartronia*, xvi
Chartronia, Suppl., p. xvi; *binodata*, *costigera*
Chartronia, ix, clxix; distinction from *Gammiradiata* species, cxxx; classification, cxviii
 Cheltenham, 7, lv, cxxi, cxc; pisolite beds compared to sands at Frocester, J. Buckman, 3; district and Fontannesia, cxc
 Chemnitzia, 45
 Chideock, 324, xxxv, lii, liii, liv, lv, lvi, lix, lx, lxiii, lxv, lxvi, lxxiv, xci, cxxxix, clxx, clxxxiii, clxxxvii; strata of, ccvi, ccvii, ccviii
 Chili, 258, 453, clxxxiii
 chronology, v; to indicate sequence of species, v; of *Pseudogrammoceras*, cliv
 Cidaris, 43
circulare, *Tmetoceras*, Pl. 48, figs. 1-3 (*T. scissum*); Suppl., p. clxx
cirrata, *Cosmogyrta*, Suppl., Pl. 10, figs. 32-34; p. liv
cirrata, *Cosmogyrta*, note on, lxxxii
 Clark, J. E., and *Catulloceras Dumortieri*, 278
 Classification, 14, 125-141; by Zittel, 126; by Haug, 127; by descent, 129; object of generic, 446; ornament no value for, 447; value of features for, i; outward form subordinate in value in, i; criteria of affinity in, i; modern, difficulties in, owing to large volumes; the necessity for mounting figures on separate slips, viii; of *Lillia-Haugia* series, ix; hemeral, ccv; generic, cxvii
 Clatcombe, 108
 clausus, *Nautilus*, cci
 Clay beds, upper, date of, ccviii
 Cleeve Hill, 6, 19; strata of, ccvi, ccvii
climacomphalum, *Hammatoceras*, 157
 Closeworth, cxc
 Clypeus grit, 7, ccix; date of, ccvi; limestones above, date of, ccvi
 Coaley, 166
 Coaley Peak, 179, 196, 198, 255; geology of, 44
 Coaley Wood, 40, 41, 86, 88, 114, 148, 151, 152, 153, 158, 173, 181, 183, 184, 202, 204, 208, 220, xxii, xxv, xxvi, xxvii, xxxi, cxxx, cxxxii, cxxxiii, cxxxv, cxxxvii, cxliii, cxlv, cxlvi, cxlvii, cxlviii, cxlix, clviii, clx; section of, 45; strata of, ccix
 coarctata, *Dictyothyris*, *hemera*, ccv

- Coastal deposits, 455
oela, *Reynesia*, Pl. 16, figs. 10, 11, p. 92 (*Hyperlioceras Walkeri*); Suppl., Pl. 18, fig. 28; p. civ
Cœloceras; *blagdeni*
cognatum, *Cardium*, 48
Coiling, excentric, cxliv, cliv
Coiling in, stages of, cci
Coiling out, stages of, cci
Cold Comfort, rubbly oolite compared, 3; strata of, ccvii
Cole, strata of, ccviii
Collenotii, *Ammonites*, 226
Collyweston Slate, 48
comata, *Pleydellia*, Suppl., Pl. 10, figs. 11-13; p. cxxxviii
Combinations, innumerable number of, excix
comensis, *Lillia*, 109; *Ammonites*, 109, 170, vii, x, xi, xii
Commune-zone, 131, 163, 165, 223, 282; reason for term, 114
compactile, *Harpoceras*, 45, 46, 47, 85
compactile, *Pseudolioceras*, p. clix
compactile Pseudolioceras, Pl. 20, figs. 3, 4, see **gradatum**, P.; Pl. 20, figs. 5, 6, *pumilum*, P.; p. 85, see spp. above
compactile, *Pseudolioceras*, 81, clviii, clix
compactilis, *Ammonites*, 85
compactum, *Platygraphoceras*, Pl. 15, figs. 3, 4, Pl. A, fig. 17, p. 76 (*Lioceras apertum*); Suppl., Fig. 57 in text, p. xcv
Comparative development (*Dumortieria*), clxxxiv
Comparative table, 144
complanata, *Dorsetensia*, Pl. 53, figs. 1-10; p. 306
complanatus, *Ammonites*, 127, 217
Compressa, cxiii
compressa, *Haugia*, Suppl., Pl. 2, figs. 8-10; p. xxvii
compressa, *Haugia*, xi
Compression, progressive, lxxxix
compressum, *Pseudographoceras*, Pl. 15, figs. 5, 6; p. 72 (*Lioceras concavum*); Suppl., Pl. 15, fig. 21; p. xciii
Compton, 19, 266
comptum, *Harpoceras*, 53
comptum, *Lioceras*, Suppl., Pl. 7, figs. 7-12; p. xliii
comptum, *Lioceras*, 43, 52
comptus, *Ammonites*, 54, 184, 248; *Nautilus*, 53, xxxvi, xliii
concava, *Ludwigella*, Pl. 2, figs. 5, 6; Pl. 8, figs. 1, 2; p. 56 (*Lioceras concavum*); Suppl., Fig. 51 in text, p. lxxxvi
concava, *Ludwigella*, *hemera*, ccv
concave, iv
concavi-fastigate, iv
Concavi hemera, vi; strata of, ccvii
Concavum bed, developments of, 61, 62
Concavum beds, remarks on, 63; correlation with *Cotteswold* strata, 65
concavum, *Harpoceras*, 56
concavum, *Lioceras*, Pl. 2, figs. 6, 7, see **concava**, *Ludwigella*; Pl. 6, see **magna**, *Lucya*; Pl. 8, figs. 1, 2, see **concava**, *Ludwigella*; Pl. 8, figs. 3, 4, **decorum**, *Graphoceras*; Pl. 8, figs. 5, 6, **sublineata**, *Brasilia*; Pl. 8, fig. 7, **fiacidum**, *Graphoceras*; Pl. 9, figs. 8-10, **stigmatosum**, *Graphoceras*; Pl. 10, figs. 3, 4, see **pulchra**, *Brasilia*; Pl. 10, fig. 9, **undulatum**, *Graphoceras*; Pl. 15, figs. 5, 6, see **compressum**, *Pseudographoceras*; p. 56, see spp. above
concavum, *Lioceras*, 9, 12, 301, 374, 447, lxxvi, lxxix, lxxx, lxxxi, lxxxvi, xciii, xcvi, xcvi, xcvi
concavum var. **formosum**, *Lioceras*, Pl. 10, figs. 1, 2, p. 65, see **formosum**, *Depaceras*
concavum, var. **pingue**, *Lioceras*, Pl. 12, figs. 1-3, p. 66, see **pinguis**, *Brasilia*
concavum, var. **v-scriptum**, *Lioceras*, Pl. 9, figs. 1-4, see **cavata**, *Lucya*; Pl. 9, figs. 5, 6, **stigmatosum**, *Graphoceras*; Pl. 9, fig. 7, **limitatum**, *Graphoceras*; Pl. 10, figs. 5, 6, **v-scriptum**, *Graphoceras*; Pl. 10, figs. 7, 8, **limitatum**, *Graphoceras*; p. 68, see spp. above
concavum, *Lioceras*, table of varieties of, 74
Concavum-zone, 223, 282, 291, 292, 317, 320, 321; regarded as *Sowerbyi*-zone, 342; absent or destroyed from large part of Continent, 452; divisible into two or three parts, 447; note on, see Explanation of Pl. 46
Concavumbilicate, iv; species, relation to **gradumbilicate**, xcvi; species, note concerning **homœomorphy** of, xcvi
concavus, *Ammonites*, 35, 56, 68, lxxxvi; bowl-shaped umbilicus of, iv
Concentric umbilicus, 323

- concentrica**, *Fontannesia*, Suppl., Pl. 24, figs. 5, 6; p. cxc
- Concentrilatumbilicate**, v
- Concentrumbilicate**, v
- Conch**, i
- concinna**, *Darellia*, Suppl., Pl. 18, figs. 16-18; p. cxiv
- Cone**, coiling of, cci
- confusum**, *Lytoceras*, cc
- confusus**, *Ammonites*, 268
- confusus**, *Polymorphites*, 234
- Conglomerate-bed**, date of, ccvi
- conjungens**, *Ammonites*, cxv
- conjungens**, *Æcotraustes*, Pl. 20, figs. 13, 14, see **nodifer**, Æ; Pl. 20, figs. 15-17, **costiger**, Æ.
- conjungens**, *Æcotraustes*, cxiv, cxv
- connectens**, *Hildoceras*, xxxvi
- contorta**, *Braunsina*, Suppl., Pl. 17, figs. 16-18; Fig. 62 in text, p. xcix
- contusa**, *Sonninia*, Pl. 88, figs. 5-7; pp. 387, 409
- Convergence**, 77, 177, 195, 234; manner of, 137; and law of development, 178; of *Dumortieria* and *Grammoceras*, 234; of *Dumortieria* and *Sonninia*, 340; complicated cases of, 257, 340; degeneration producing; senescent and senile period producing, 284
- Convex**, iv
- Convexi-fastigate**, iv
- Convexi-fastigate (series)**, lxxx, ciii
- Conybearei**, *Ammonites*, xvii
- Conybearii**, *Verniceras*, cc
- Cooke**, M. C., on name *Dumortieria*, 286
- Coquand**, see Bayle & Coquand
- Coral bed**, upper, 7
- Coralline beds**, date of, ccvi
- Cordilleras**, 148, 157
- Cornbrash**, 230
- cornigera**, *Braunsina*, Suppl., Pl. 20, figs. 4-6; p. c
- cornu**, *Harpoceras*, 20; *Hildoceras*, lxxxv; *Hildoceras* (*Ludwigia*), 20
- cornu**, *Ludwigia*, Pl. 4, figs. 1, 2, see **arcitenens**, *Ludwigella*; Pl. 4, figs. 3, 4, see **cornu**, *Ludwigella*; p. 20, see spp. above
- cornu**, *Ludwigia*, 223, 301, lxxxv; typical form of, 65
- cornu**, *Ludwigella*, Pl. 4, figs. 3, 4; Pl. A, fig. 6; p. 20 (*Ludwigia cornu*); Suppl., Figs. 48-50 in text, p. lxxxv
- Coronate**, radical, 272; *Ammonites*, 454
- Coronaten-schichten**, 293
- coronatus**, *Amaltheus*, 287, 291
- Coroniceras**, 289, 290, cc, cci
- Correlation**, Bradford Abbas and Stroud, 7; of Osborne and Wyke, 9; Dundry and Dorset, 63; Yorkshire, Northampton, Cotteswolds, Dorset-Somerset, 168; of deposits, ccvi
- corrugata**, *Ludwigia*, 375
- corrugatum**, *Harpoceras*, 302
- Corton**, strata of, ccvii
- Corton Downs**, 19, 61, 62, 275; strata at, like Oolite Marl, Notgrove; fossils of, not those of Oolite Marl, 9
- cortonensis**, *Terebratula*, 63
- cosmia**, *Strophogyria*, Suppl., Fig. 20 in text, p. lxiii; p. lxii
- Cosmoceras**, 14, 270; *garantianum*, *hollandæ*, *niortensis*, *parkinsoni*, *regleyi*, *subfurcatum*
- Cosmogyria**, p. lii; *cirrata*, *maggsi*, *obtusa*, sp., *subtabulata*
- Cosmogyria**, from *Ludwigia*, lxix; classification, cxviii
- Costa**, iii; see also **costistria**, **crassicostate**, **densicostate**, **parvicostate**, **paucicostate**, **radius**, **striicosta**
- Costæ connate (series)**, cxxxiv; simple (series), cxxxiii
- costata**, *Sonninia*, Pl. 74, fig. 1; Pl. 75, figs. 1, 2; Figs. in text, 6, p. 384; 32, p. 394; 58, p. 443; pp. 338, 385, 395
- Costata stock**, 336
- Costate and striate stages**, xxxviii
- Costate**, *Sonniniæ*, 448; species, xxxvi
- Costate stage**, species, xxxvi; examples of, 289; (*Æcotraustes*), cxv
- Costate (series of Dumortieria)**, clxxvi
- Costate to Spissicostate (series of Dumortieria)**, clxxix
- Costate to Striate (series of Dumortieria)**, clxxx
- Costation**, cc; progressive decline of, lxxxix
- Costi-stria**, iii
- costatum**, *Ancolloceras*, Pl. 7, fig. 7; Pl. A, fig. 11; p. 29 (*Lioceras ambiguum* var. *costatum*); Suppl., Pl. 17, fig. 30; p. xlviii

- costatum, *Lioceras*, 20
- costiger**, *Æcotraustes*, Pl. 20, figs. 15-17; Pl. A, fig. 9 (*Æ. conjungens*); Suppl., Fig. 190, p. cxcvi; p. cxcv
- costigera**, *Chartronia*, Suppl., p. clxi
- costigera**, *Sonninia*, Pl. 102, figs. 1-3; Figs. in text, 26, p. 391; 52, p. 428; 78, p. 443; p. 428
- costosa**, *Ludwigia*, Pl. 20, figs. 11, 12, p. 102, see **subcostosum**, *Lioceras*
- costosum**, *Lioceras*, Suppl., Pl. 6, figs. 1-4, p. xxxvii
- costula**, *Ammonites*, 12, 127, 197, 227, 238, 259, xxxvi, cxxxiii, cxxxiv; list of species so identified, 238
- costula**, *Dumortieria*, Pl. 37, figs. 12, 13, p. 237; Pl. 37, figs. 18, 19, p. 245 (*Dumortieria* sp.); Suppl., Fig. 166, p. cxcvii; p. clxxv
- costula**, *Dumortieria*, Pl. 37, figs. 14, 15, p. 237 (pars), see **munieri**, D.
- costula**, *Harpoceras*, 197, 238; *Harpoceras* (*Dumortieria*), 239; *Ludwigia*, 238; *Nautilus*, 237, clxxv
- costulata**, *Cotteswoldia*, Pl. 33, figs. 3, 4, p. 197 (*Grammoceras costulatum*); Suppl., Pl. 23, figs. 4, 4a; p. cxxxiii
- costulatus**, *Ammonites*, 197
- costulatum**, *Grammoceras*, Pl. 33, figs. 3, 4, p. 197, see **costulata**, *Cotteswoldia*
- costulatum**, *Grammoceras*, p. cxxxiii
- Cotteswold district, 37
- Cotteswold Hills, 158
- Cotteswold Sands, 7, 43, 168, xii; Oppel, opinion on, 50; position of, 113; sections, 44, 45, 46, 47, 164; (Frocester Hill), base of so-called Inferior Oolite, v; argillaceous, clvi; date of, ccix
- Cotteswold Sections, analysis of, 49
- Cotteswold strata, xxxv
- Cotteswoldia**, Suppl., p. cxxxiii; **attrita**, **bifax**, **costulata**, **crinita**, **distans**, **egena**, **limatula**, **misera**, **particostata**, **paucicostata**, sp., **subcandida**, **superba**
- Cotteswoldia*, from *Pleydellia*, cxxxvii; classification, cxcviii
- cotteswoldiæ*, *Grammoceras*, 200, 222, 223, 224
- cotteswoldiæ*, *Pseudogrammoceras*, Pl. 35, figs. 4-6; p. 204 (*Grammoceras fallaciosum* var. *Cotteswoldiæ*); Suppl., fig. 144, p. clxvii; p. cxlix
- Cotteswolds, 50, 61, 91, 96, 145, 167, 213, 244, 249, 258, 274, clxx; geological phenomena xii; stratal succession in, xxxv; strata of, ccvi, ccvii, ccix
- Cranmore, 208; presence of *Grammoceras* at, 168; strata of, ccviii
- crassa**, *Sonninia*, Pl. 82, figs. 1, 2; Pl. 100, fig. 10; Figs. in text, 8, p. 385; 34, p. 397; 60, p. 443; pp. 350, 398,
- Crassa-stock*, 347; separation of species in, 348
- crassibullata**, *Sonninia*, Pl. 80, figs. 1-3; Pl. 103, fig. 17; Figs. in text, 10, p. 386; 36, p. 400; 62, p. 443; pp. 353, 400
- Crassicarinate* (series), cxix
- crassicostata**, *Sonninia*, Pl. 80, figs. 4-6; Pl. 103, fig. 18; pp. 354, 385, 398
- Crassicostate*, iii
- crassiformis**, *Sonninia*, Pl. 79, figs. 1-6; Figs. in text, 11, p. 386; 37, p. 401; 63, p. 443; pp. 348, 401
- crassiformis*, *Sonninia*, to preserve spines of, 413
- crassinuda**, *Sonninia*, Pl. 81, figs. 1-4; pp. 351, 399
- crassispinata**, *Sonninia*, Pl. 57, figs. 1, 2; Pl. 65, fig. 5; Pl. 93, fig. 7; pp. 317, 390, 425
- crassispinata*, *Sonninia*, Pl. 48, figs. 16, 17, see **reclinans**, S.; Pl. 50, figs. 16-22, **locuples**, S.; Pl. 65, figs. 3, 4, see **reclinans**, *Sonninia*; p. 317 (pars), see spp. above
- crassispinata*, *Sonninia*, 421, 425, 431, 432
- Crassornate*, iv, viii, ix
- crassum**, *Dactylioceras*, 272
- Craterumbilicate*, v
- Crenulate carina*, late appearance, 295
- Cretaceous species*, multispinous stage, 289
- Crewkerne*, species akin to *Ancolloceras* at, xlviii
- Crewkerne Station*, 10, 194; strata of, ccvi
- Crick, G. C., on *Harp. variabile*, 146; drawings of *A. striatulus*, 176; and *A. Moorei*, 256; and *Am. jugosus*, xxv; on *Brodia*, cxxxiii; and *Crickia*, lxxiii; and *A. concavus*, lxxxvi; on *Harp. radians*, cxlv, cxlix
- Crick, W. D., and *Lioceras comptum*, 55
- Crickia**, Suppl., p. lxxiii; **reflua**
- Crickia*, classification, cxcviii
- crinalis**, *Brasilina*, Suppl., Pl. 10, figs. 29-31; p. lxxxiv

- crinita*, Cotteswoldia, Pl. 31, figs. 3, 4; p. 177
(Grammoceras mactra); Suppl., Fig. 111, p. clxv; p. cxxxvii
- Criteria of affinity, i
- Cruciform, arrangement of, lobes considered, 382
- Crussol, lxxiii
- Cucullæa, 48
- Cumings, E. R., and Brachiopoda, cxcix
- cuneatum*, Deltotoceras, Suppl., Pl. 16, figs. 7-9; p. cxix
- Curioni, Ammonites, 84, 132, 138, 139
- curva*, Brodieia, Suppl., p. xxxii, see *curvum*, Brodiceras
- curva*, Hugia, Suppl., Pl. 18, figs. 19-21 a; Pl. 21, figs. 25-27; p. cxi
- curvata*, Fontannesia, Pl. 47, figs. 1-5; Pl. 65, figs. 6, 7; p. 262 (Dumortieria grammoceroïdes); p. clxxxix
- curvicostatum*, Hyperlioceras, Suppl., Pl. 16, figs. 4-6; p. cxxiv
- curvifrons*, Terebratula, different, in South of England and Cotteswolds, 9
- curvum*, Brodiceras, Pl. 22, figs. 35, 36; Suppl., p. xxxii (Brodieia curva)
- Cycle of Development, ccii
- Cycloceras, 14, 127, clxix
- Cycloceratidæ, 13
- cycloides*, Ammonites, 115, 117; Harpoceras, 117; Hildoceras, 117
- cycloides*, Pœcilomorphus, Pl. 22, figs. 1-22; Pl. A, figs. 31, 32; p. 117
- cycloides*, Pœcilomorphus, table of dimensions, 118; Phylloceras, 115, 116, 119
- Cylicoceras, Suppl., p. xlix; undatum
- Cylicoceras, from Geyeria, 1; from Welschia, li; classification, cxcviii
- cymatera*, Sonninia, Pl. 73, figs. 2, 3; Pl. 100, figs. 5-7; pp. 332, 390, 420
- Cymbites, cci; globosus
- cymbium, Ostrea, 258
- cynocephala*, Rhynchonella, 8, 44, 46, 48, 52, 164
- Cypholioceras, Suppl., p. xliii; opaliniforme, pigrum, plicatum, renovatum, vitiosum
- Cypholioceras, xxxv; history of, xxxiii, xlv; geological position of, xlv; from Lioceras, xxxiv; from Geyeria, 1; classification, cxcviii
- Cypriocardia, 45
- Dactylioceras, 272; annulatum, crassum, holandrei Damon, cxviii; and Maggs' Collection, 247
- Darell, Darell Stephens, change of surname, cxii; and see Stephens, Darell
- Darelleinae, classification, cxcviii
- Darellella*, Suppl., p. cvii; *recticostata*
- Darellella*, from Reynesella, cix; classification, cxcviii
- Darellia*, Suppl., p. cxii; *concinna*, *lævis*, *polita*, *semicostata*, *toxeres*
- Darellia*, from Toxolioceras, cxvi; from Stokeia, cxxviii; classification, cxcviii
- Darellina*, Suppl., p. cvi; *docilis*, *dorsetensis*, *planaris*
- Darellina*, from Darellella, cvii; classification, cxcviii
- Davidson, Dr. T., 1; on Tereb. simplex, 8
- Davidsoni, Perisphinctes, 10; descent of, 272
- debile*, Graphoceras, Suppl., Pl. 20, figs. 22-24; p. xcvi
- decipiens*, Brasilia, Pl. 12, figs. 8, 9, p. 30 (Lioceras *decipiens*); Suppl., Pl. 11, fig. 35; Fig. 43 in text, p. lxxxii
- decipiens*, Lioceras, Pl. 12, figs. 8, 9, p. 30, see *decipiens*, Brasilia
- decipiens*, Lioceras, lxxxii, ciii, civ, cxiii
- decipiens* var. *intermedium*, Lioceras, Pl. 12, figs. 2, 3, see *intermedia*, Reynesia; Pl. 12, figs. 4, 5, *lepida*, R.; Pl. 12, figs. 6, 7, *laxa*, R.; Pl. 12, figs. 10, 11, *semicostata*, Darellia; p. 33, see spp. above
- decipiens* var. *simile*, Lioceras, Pl. 15, figs. 1, 2, p. 31, see *similis*, Brasilia
- declinans*, Dumortieria, Pl. 40, figs. 10-12, p. 243 (D. striatulocostata); Suppl., Fig. 171, p. cxvi; p. clxxvii
- Decline (effects of), cxxx; progressive, lxxxix
- decora*, Sonninia, Pl. 84, figs. 12-14, pp. 361, 387, 412
- decorata*, Sonninia, Pl. 84, figs. 7, 8, pp. 360, 387, 412
- decorum*, Graphoceras?, Pl. 8, figs. 3, 4, p. 56 (Lioceras *concauum*); Suppl., Pl. 15, fig. 19; p. xcvi
- Definition, note concerning, xciv
- Definitions, generic, interpretation of, cciii
- deflexum*, Hyperlioceras, Pl. 19, figs. 1, 2, p. 98 (Hyperlioceras *discoideum*); p. cxxii

- Degeneration, lxiv; of spinicostæ into nodicostæ, 357; features of, cxxxi; and septicarina, cliii, clvii; of carina, see carina
- deletum**, *Pseudographoceras*, Suppl., Pl. 11, figs. 22-24, p. xci
- delicata**, *Ædania*, Suppl., Pl. 21, figs. 10-12, p. cviii
- delicata**, *Walkeria*, Suppl., Fig. 122, p. cxl
- deltafalcatus**, *Ammonites*, 82
- Deltiradiæ** (series), cxvii
- Deltoceras**, cxix, see **Deltotoceras**; subsectum
- Deltoid**, cxvii
- Deltoidoceras**, Suppl., p. cxvii; **astictum**, **idoneum**, **subdiscoideum**
- Deltoidoceras**, from **Deltotoceras**, cxix; classification, cxcviii
- Deltotoceras**, Suppl., p. cxix; **cuneatum**, **discoideum**, **subsectum**, **triangulare**
- Deltotoceras**, classification, cxcviii
- Denckmann**, Dr. A., 83, 85, 87, 146, 153, 169, 174, 182, 200, 202, 203, 205, 207, 209, 211, vii, viii, ix, x, xi, xvii, xxvi, xxvii, cxliv, cxlviii; on *Amm. Sæmanni*, etc., 206; and *Denckmannia*, xvii
- Denckmannia**, Suppl., pp. ix, xvii; **aspera**, **bredonensis**, **iserensis**, **malagma**, **obtecta**, **torquata**, **tumefacta**
- Denckmannia**, clxix; from *Haugia*, xxii; classification, cxcviii
- densicostata**, *Sonninia*, Pl. 88, figs. 8, 9 a, p. 375
- Densicostate**, iii
- Densisept**, 111, cc
- Densiseptate**, v
- Depaoceras**, Suppl., p. lxxvii; **fallax**, **formosum**, **hamatum**
- Depaoceras**, from *Lucya*, *Paineia*, lxxiv; suggested relationship to *carinatitabulate* forms, cxiv; from **Deltoidoceras**, cxvii; classification, cxcviii
- Deposit**, no influence on *Ammonites*, xv
- Deposits**, coastal, 455; fossiliferous, 455; *Ammonitiferous*, 456; correlation of, cevi
- depressus**, *Ammonites*, 216
- Deroceras**, 129, 295; character of spines, 314; character of tubercles of, iii
- Descendants** of *S. zigzag*, 272
- Description**, note concerning, xciv
- Descriptions**, specific, interpretation of, cciii
- Desori**, *Ammonites*, 97, 98; *Harpoceras*, 97
- desori**, *Hyperlioceras*, Pl. 17, figs. 6, 7, p. 97; Suppl., Fig. 89; Fig. 90, p. clxv; p. cxxii
- despecta**, *Fontannesia*, Pl. 47, figs. 6, 7, p. 262 (*Dumortieria grammoceroides*); p. cxci
- Deux-Sèvres**, 172
- Development**, laws of, 134; omission of intermediate stages in, 159; of ventral area, changes in, 159; reversion, 159; omission of dissimilar stage, 224; introduction of modifications, 224; more rapid earlier inheritance of latest stages, 224; elimination of useless stages, 224; persistence of embryonic characters, 224; stages of, 289; renewed progressive, 290; renewed progressive, example of, 334; formulæ of, 382, 383; temporary or arrested, li; arrested, specimen showing, lxxiv; comparative (*Dumortieria*) clxxxiv; relative, cxci; phenomena of, cxci; normal, stages of, cci; cycle of, ccii; see *Hildoceratidæ*
- Developmental variation**, 289
- Dew bed**, suggested equivalence to Gloucestershire Cephalopod bed, 7; date of, ccviii
- Dewalque**, see *Chapuis & Dewalque*
- difalensis**, *Parkinsonia*, 272
- Differentiation**, formulæ of, 382, 383
- digna**, *Canavarina*, Suppl., fig. 127, p. clxvii; fig. 129, p. cxli
- Digne**, *Ammonites* from, 301
- Dimensions**, terms for, cxvii
- dimorphum**, *Morphoceras*, ccii
- diphyes**, *Dumortieria*, Pl. 42, figs. 13-15; Pl. 43, figs. 5-7, p. 253 (*D. radiosa*); p. clxxx
- Direct ribs**, 231
- Discitæ hemera**, vi
- Discitæ**, *hemera*, strata of, ccvii
- discites**, *Ammonites*, 94, cxxii
- *discites**, *Hyperlioceras* [Foreign], Fig. 87, p. clxv; Fig. 88, p. cxxii
- discites**, *Hyperlioceras*, Pl. 16, figs. 12, 13, see **discitifforme**, *Hyperlioceras*; Pl. 17, figs. 1, 2, **liodiscites**, **H.**; Pl. 17, figs. 3, 4, **rudidiscites**, **H.**; Pl. 17, fig. 5, **subleve**, **H.**; Pl. 18, figs. 1, 2, **rudidiscites**, **H.**; Pl. 18, fig. 3, **subleve**, **H.**; Pl. 18, figs. 4, 5, **lævis**, **Darellia**; p. 94, see spp. above

- discites, *Hyperlioceras*, 88, 434, cxiii, cxvi, cxiii, cxiv, cxv
- discites, *Hyperlioceras*, hemera, ccv
- discitiforme, *Hyperlioceras*, Pl. 16, figs. 12, 13, p. 94 (*H. discites*); Suppl., Pl. 18, figs. 7-9, 23; p. cxxiv
- Discoceratidae, 13
- discoides, *Ammonites*, 12, 40, 45, 165, 175, 215; sutures of, mistakes in by d'Orbigny, 219; *Harpoceras*, 215; *Leioceras*, 215; *Oxynoticeras*, 45
- discoides, *Polyplectus*, Pl. 37, figs. 1-5, p. 215; Suppl., Fig. 157, p. clxvii; p. clvii
- discoides, *Polyplectus*, 223, xxxiii
- aff. discoideum, *Deltotoceras*, Suppl., p. cxx
- discoideum, *Hyperlioceras*, Pl. 19, fig. 1, 2, see deflexum, H., Pl. 19, figs. 3, 4, subsectum, *Deltotoceras*; p. 98, see spp. above
- discoideum, *Hyperlioceras*, cxx, cxxi, cxxii
- *discoideus, *Ammonites*, Quenstedt [Foreign], Fig. 85, p. cxx
- discoideus, *Ammonites*, 98, cxxiv
- discus, *Ammonites*, 230; *Oppelia*, hemera, ccv
- Dispansi hemera, vi, cliv; strata of, ccviii
- Dispansum beds, 164, 165, 166, 167, cliv
- dispansum, *Grammoceras*, Pl. A, figs. 41, 42, p. 211, see dispansum, *Phlyseogrammoceras*
- dispansum, *Grammoceras*, 164, 165, clv; *Harpoceras*, 192, 211; and *Haugia variabilis*, comparison of, 212
- dispansum, *Phlyseogrammoceras*, Pl. A, figs. 41, 42, p. 211 (*Grammoceras dispansum*); Suppl., p. clv
- dispansum, *Phlyseogrammoceras* (hemera), ccv
- dispansus, *Ammonites*, 211; Lycett's remarks on, 185; (*Harpoceras*), 211
- Dissoroceras, Suppl., p. cxv; excavatum, subornatum, tabulatum
- Dissoroceras, classification, cxviii
- distans, *Cotteswoldia*, Pl. 33, figs. 1, 2, p. 196 (*Grammoceras distans*); Suppl., Pl. 23, fig. 8, p. cxxxvi
- distans, *Grammoceras*, Pl. 33, figs. 1, 2, p. 196, see distans, *Cotteswoldia*
- distans, *Grammoceras*, cxxxvi
- Distincticarinata, cvi
- Distincticarinata (series), cvii, cxii
- Distinction, specific, cxcix
- Distinctive fossils, cc
- diversa, *Sonninia*, Pl. 81, figs. 5, 6; Pl. 83, figs. 1, 2; Pl. 103, fig. 8; Figs. in text, 9, p. 385; 35, p. 398; 61, p. 443; pp. 355, 399
- docilis, *Darellina*?, Suppl., Pl. 22, figs. 4-6, p. cvii
- dœrntense, *Grammoceras*, Pl. 29, figs. 1-5, see dœrntense, *Pseudogrammoceras*; Pl. 29, figs. 6, 7, sp., P.; Pl. 29, figs. 8-10, Pl. 33, figs. 11, 12, placidum, P., p. 182, see spp. above
- dœrntense, *Grammoceras*, 164, 244, cliii
- dœrntense, *Pseudogrammoceras*?, Pl. 29, figs. 1-5, p. 182 (*Grammoceras dœrntense*); Suppl., Fig. 151, p. clxvii; p. cliii
- dœrntensis, *Ammonites* (*Harpoceras*), 182
- Dogger, 167, 229, ccviii
- Dohnsen, 96
- dominans, *Sonninia*, Pl. 66, figs. 1, 2; Pl. 94, figs. 1, 2; Pl. 95, fig. 1; Pl. 97, fig. 4; Figs. in text, 29, p. 391; 55, p. 435; 81, p. 443; pp. 322, 435
- dominans, *Sonninia*, Pl. 67, figs. 1, 2, see sp., *Sonninia*; Pl. 69, see dominica, *Sonninia*; p. 323, see spp. above
- dominans β , *Sonninia*, p. 323, see dominata, *Sonninia*
- dominans δ , *Sonninia*, p. 323, see dominatrix, *Sonninia*
- dominans, *Sonninia*, 392, 408, 438, cc
- dominata, *Sonninia*, Pl. 97, figs. 1-3; Figs. in text, 13, p. 387; 39, p. 408; 65, p. 443; p. 408
- dominata, *Sonninia*, 436
- dominatrix, *Sonninia*, Pl. 94, figs. 3, 4; Pl. 95, fig. 2; Figs. in text, 4, p. 384; 30, p. 392; 56, p. 443; p. 392
- dominatrix, *Sonninia*, 436
- dominica, *Sonninia*, Pl. 69, figs. 1-3 (*S. dominans*); Pl. 103, fig. 14; Figs. in text, 14, p. 387; 40, p. 410; 66, p. 443; pp. 388, 410
- dominica, *Sonninia*, 436
- Dornseatas, 359
- Dorset, 3, 5-10, 19, 22, 23, 26, 28, 31, 40, 41, 47, 50-53, 61-65, 96-100, 106, 108, 115, 117, 247, 251, 258, 265, 266, 274-276, 278, 292, 296, 297, 304, 305, 310, 312, 320, 321, 324, 360, 361, 363, 376, 397, 399, 401, 455, xv, xxiii, xxxiv-xliv, xlviii, li-lxvi, lxxiii-lxxii, lxxiv-cxxi, cxxiv-cxxix, cxxxviii, cxl, cxlii,

- clvii, clxxi, clxxii, clxxxv, clxxxviii–cxcii, cxcv ;
Cephalopod bed compared, 3; not to add shire,
359; stratal succession in, xxxv; strata of,
ccvi–ccix; see North Dorset, South Dorset
Dorset Coast, Dumortieria strata on, clxxxiii
Dorset-Somerset, 163, 164, clxxxviii; district, 168
Dorsetensia, p. 302; Suppl., p. cxcii; **complanata**,
edouardiana, **lennieri**, **liostraca**, **pulchra**,
romani, sp., **subtecta**, **tecta**
Dorsetensia, genealogy of (Table VII), 312; from
Sonniniæ, 314; classification, cxcviii
dorsetensis, **Darellina**, Suppl., Fig. 67, p. cvi
dorsetensis, **Parkinsonia**, cc
Douvillèi, **Hildoceras**, 112, 116, 136
Douvillè, 14, 17, 287; 293, 294, 295, 298, lxx; on
Ludwigia Haugi, 16
Down Cliff, Upper Lias clay of, belongs to Dumor-
tieria beds, 251; strata of, ccix
Dumbleton, Middle Lias, species by mistake
from, c
Dumortier, E., 35, 61, 85, 107, 143, 146, 147, 149,
150, 155, 156, 168, 170, 174, 176, 189, 190,
192, 200, 202, 203, 204, 206, 207, 210, 215,
227, 230, 238, 241, 246, 248, 250, 256, 268,
269, 272, 273, 277, 278, 283, vi, vii, viii, xiv,
x, xi, xvii, xviii, xx, xxi, xxii, xxiv, xxv, xxx,
xxxii, xxxvi, cxliv, cxlvii, clviii, clxxxviii, clxxxix,
clxxxvii; on *Am. concavus*, 39; on *A. Ogerieni*,
149; remarks on *Ammonites tolutarius*, lxxiii;
& Fontannes, 277
Dumortieri, *Ammonites*, 277
dumortieri Catulloceras, Pl. 39, figs. 6–9, p.
277
Dumortieri, *Dumortieria* (*Catulloceras*), 276, 277;
Harpoceras, 277
dumortieri, *Haugia*, p. 152, see *dumortieri*, **Phyma-**
toceras
dumortieri, *Haugia*, xi, xxx
dumortieri, **Phymatoceras**, Pl. 23, figs. 16, 17;
Pl. A, fig. 36 (*Haugia Ogerieni*); p. 152
(*Haugia Dumortieri*); Suppl., p. xxx
dumortieri, **Pseudolioceras**, Suppl., p. clviii
dumortieri, *Simoceras*, 277
Dumortieria, p. 231; Suppl., p. clxxii; **arata**,
arenaria, **brancoi**, **costula**, **declinans**, **diphyes**,
exacta, **exigua**, **explanata**, **externicompta**,
externicostata, **falcofla**, **grammoceroïdes**, in-
clusa, **jamesoni**, **lata**, **latescens**, **lessbergi**,
levesquei, **linearis**, **metita**, **moorei**, **multicos-**
tata, **munda**, **munieri**, **mutans**, **novata**, **pauci-**
septata, **penexigua**, **prisca**, **pseudoradiosa**,
radians, r. var. **exigua**, **radiosa**, r. var. **gunders-**
hofensis, **regularis**, **rhodanica**, **rustica**, **sig-**
nata, **solaris**, sp., **sparsicosta**, **striatulocostata**,
subexcentrica, **subfasciata**, **subsolaris**, **sub-**
undulata, s. var. **externicompta**, s. var. **exter-**
nicostata, s. var. **striatulocostata**, **suevica**,
tabulata, **vernosa**, **yeovilensis**; (*Catulloceras*)
dumortieri
Dumortieria, 127, 163, 186, 290, 305, 339, 379,
clxix; from *Grammoceras*, 162; geological
position, 235; literature on, 236; note on prior
use of name, 286; genus of *Hepaticæ*, 286;
sp. for *Grammoceras striatulum*, xlv; syn.
of *Grammoceras*, cxxxi; localities for, clxix;
strata, on Dorset coast, clxxxiii; comparative
development in, clxxxiv; syn. of *Fontannesia*,
clxxxvii; from *Fontannesia*, clxxxvii
Dumortieria beds, 164, 165, 166, 167; importance
of, 166; as Upper Lias Clay at Down Cliff,
251
Dumortieria, thickness of strata yielding, clxxxiii;
sp. *hemera*, vi, ccv; *hemera*, strata of, ccviii
dundriensis, **Sonninia**, Pl. 23, figs. 5, 6 (*Son-*
ninia? sp.); Suppl., p. cxci
Dundry, 1, 61, 63, 73, 90, 103, 117, 168, 173, 278,
292, 434, xxix, liii, lvi, xevi, xevii, cii, ciii,
cix, cxiii, cxiv, cxxv, cxxviii, cxlvi, cxlviii,
clxxxviii, cxci, cxcii; ironshot, compared to
sands at Frocester, J. Buckman, 3; strata at,
63, 90; presence of *Grammoceras* at, 168;
section of, 292–293; *Sonninia* at, 316; emen-
dation of section of, 316; specimens from,
how marked, cix; and *Fontannesia*, clxxxviii;
strata of, ccvi, ccvii, ccviii, ccix; see *Maes*
Knoll; (*Castle Farm*), lxvi; *Hill*, see *Dundry*;
Hill, *West End*, c
duplicata, **Sonninia**, Pl. 99, figs. 1–3, pp. 386,
402
Dursley, 231, 251, 253, 279, cxxx, cxxxiii, cxliii,
cli, clxix, clxxv, clxxix, clxxx; strata of, ccviii;
see *Bowcott Wood*, *Breakheart Hill*, *Cam*
Down, *Coaley Wood*, *Stinchcombe Hill*
Duston, *Northampton*, *Northamptonshire*, xl;
strata of, ccvii; see also *New Duston* and
Old Duston

- Dwarf, *Ludwigia*, 130; race, 261; form, xcvi;
forms, clxxxiv; series, clxxxv; series (Fontannesia), clxxxix; *Sonninia*, cxci
- η = hemera, clxx, cxi
- Earlier inheritance, see inheritance
- East Coker, 23, 61, 71, cxiv; sinistral gastropods at; *Parkinsoni* zone on *Murchisonæ* zone at, 7
- East Hill Quarry, 5, 96, 335
- Echioceras*, cci
- Economy in ornament, cc; in growth, cc
- Ectobrachysceles*, 381
- Edouardi*, *Harpoceras*, 304
- edouardiana*, *Dorsetensia*, Pl. 49, fig. 4; Pl. 52, figs. 8-24; p. 304
- Edouardianum*, *Harpoceras*, 13, 304
- Edouardianus*, *Ammonites*, 304
- effricata*, *Brasilia*, Pl. 7, figs. 3, 4, p. 26 (*Ludwigia ambigua*); Suppl., p. lxxxii
- egena*, *Cotteswoldia*, Suppl., Pl. 23, figs. 9-11, p. cxxxiv
- Elaboration, stages of, cxix
- elegans*, *Ammonites*, 38, xxxvi; *Astarte*, 48; *Harpoceras*, 35, 38, 60; *Lioceras*, 12, 39, 80
- elegantula*, *Braunsina*, Suppl., Pl. 19, figs. 1-3; p. c.
- elmagum*, *Harpoceras*, 277
- elongata*, *Pleurotomaria*, 293
- Elsass-Lothringen*, *Grammoceras* in, 169
- Embryonic, 357
- Endobrachysceles*, 381
- Engelhardti*, *Amaltheus*, 291
- English Channel, 456
- Epacme*, 357
- Ephebic*, 357
- Equicellate terminal lobule, 364
- Equiposed lateral lobules, 364
- erbaensis*, *Ammonites*, 109, vii, ix, xvii
- Erosion, contemporaneous, 452
- Erycites*; fallax
- Eseri*, *Ammonites*, 107, 109, vii, xi
- Eseri*, *Ammonites*, 143, 155, 204, vii, xxix, cxlvii; *Grammoceras*, 155; *Harpoceras*, 155; group, xxviii
- eseri*, *Haugia* (Oppel), Pl. 25, figs. 3-7; Pl. 26, figs. 1, 2; Pl. A, fig. 37, p. 155; Suppl., p. xxviii
- Eseri*, *Haugia*, Pl. 25, figs. 5, 6, see *inæqua*, H.
Pl. 25, fig. 7, *fascigera*, H.; Pl. 26, figs. 1, 2, *sculpta*, H.; p. 155, see spp. above
- Eseri*, *Haugia*, 164, 223, xxix
- Eterville, lix
- Etheridgii*, *Terebratula*, 8
- Eudes Deslongschamps*, E., 172; on *Infra-Oolitic Marls*, 4
- Eudesi*, *Terebratula*, 9, 63
- euides*, *Lopadoceras*, Suppl., Pl. 21, figs. 22-24, p. cxii
- euomphalica*, *Sonninia*, Pl. 85, fig. 1-3, pp. 362, 387, 405
- Europe, correspondence of faunal sequence in South America and, 454; Southern, 456
- evertens*, *Geyeria*?, Suppl., Pl. 11, figs. 10-12, p. 1
- Evolute stage, smooth, 289
- exacta*, *Dumortieria*, Pl. 45, figs. 6, 7, p. 259 (*Dum. subundulata*); p. clxxxvii
- exaratus*, *Ammonites*, 155
- excavatum*, *Dissoroceras*, Suppl., Fig. 78, p. cxvi
- Excentric coiling, cxliv, cliv
- Excentrilatumbilicate*, v
- Excentrumbilicate*, v
- Excentrumbilication*, cci, ccii
- exigua*, *Dumortieria*, Pl. 43, figs. 11, 12, p. 252 (*Dum. radians* var. *exigua*); Suppl., Fig. 184, p. cxevi; p. clxxxiv
- expeditum*, *Pseudogrammoceras*, Pl. 34, figs. 10, 11; Pl. 35, fig. 7, p. 204 (*Grammoceras fallaciosum* var. *Cotteswoldiæ*); Suppl., Fig. 142, p. cxlviii
- explanata*, *Dumortieria*, Suppl., Pl. 22, figs. 28-30, p. clxxxv
- explanata*, *Fontannesia*, Pl. 46, figs. 6, 7, p. 262 (*Dumortieria grammoceroides*); Suppl., Fig. 187, p. cxevi; p. clxxxviii
- explicatum*, *Pseudogrammoceras*, Pl. 28, figs. 14, 15, p. 171 (*Grammoceras "toarcense-striatulum"*); Suppl., fig. 139, p. clxvii; p. cxlvi
- externicompta*, *Dumortieria*, Suppl., p. clxxxi
- externicostata*, *Dumortieria*, Pl. 40, figs. 1, 2, p. 243 (*Dum. striatulo-costata*); Suppl., Fig. 169, p. cxevi; p. clxxvii
- Extreme-, when used, cxevii
- Extremilatumbilicate*, cxevii
- Extremipachygyral*, cxevii

- Faculiformes [ribs], 294
 Falcate (series), cxi, cxxvii
 Falcate to biarcuate (series), cvii
 falcidiscus, *Pseudolioceras*, Suppl., p. clx
 falcifer, Ammonites, 12, 138, 158; type of *Harpoceras*, xxxiii
 Falciferen, 127
 Falciferi, 12, 13, 38
 falciferum, *Harpoceras*, 38, 84, 127, 165, 217, 223, 294; *Harpoceras*, hemera, ccv; zone, 131, 165, 223, 282, 291
 Falciform, sculpture, 14; ribs, 73, 294
 Falciformes [ribs], 294
 falcigera, *Edania*, Suppl., Pl. 21, figs. 1-3 a, p. cviii; Fig. 69, p. clxv
 Falciradiata (series), clvi
 falcodiscus, Ammonites, 85, clx
 falcofila, Ammonites, 241, clxxiv
 falcofila, *Dumortieria*, Suppl., Fig. 164, p. clxxiv
 falcofila macer, Ammonites, clxxiv
 falcofila-sparcicosta, Ammonites, 237, 239, clxxiii-iv
 fallaciosum, *Grammoceras*, Pl. 33, figs. 17, 18, p. 204, see subfallaciosum, *Pseudogrammoceras*
 fallaciosum, *Grammoceras*, 45, 156, 165, 204, cxlv, cxlvii, cxlviii, cxlix
 Fallaciosum-group, 163, 200; how to obtain good examples of; peculiarities of ornament in, 201
 fallaciosum, *Harpoceras*, cxlvii, cxlviii, cxlix
 fallaciosum, *Pseudogrammoceras*, Suppl., Fig. 150, p. clii
 fallaciosum var. *Bingmanni*, *Grammoceras*, Pl. 34, figs. 3-5, p. 206, see *bingmanni*, *Pseudogrammoceras*
 fallaciosum var. *Cotteswoldiæ*, *Grammoceras*, Pl. 34, figs. 10, 11; Pl. 35, fig. 7, see *expe-ditum*, *Pseudogrammoceras*; Pl. 35, figs. 4-6, *cotteswoldiæ*, P.; p. 206, see spp. above
 fallaciosum var. *Muelleri*, *Harpoceras*, cxlix
 fallaciosum var. *Struckmanni*, *Grammoceras*, p. 206, see *struckmanni*, *Pseudogrammoceras*
 fallaciosus, Ammonites, 144
 fallax, Ammonites, descent of, 129
 fallax, *Depaoceras*, Pl. 14, figs. 10, 11, p. 79 (*Lioceras fallax*); Pl. 21, figs. 7-9, p. 104 (*Ludwigia Lucyi*); Suppl., Pl. 16, figs. 1-3; Figs. 34-36 in text, p. lxxviii
 fallax, *Erycites*, 301; *Hammatoceras*, 140
 fallax, *Lioceras*, Pl. 14, figs. 10, 11, p. 79, see fallax, *Depaoceras*
 fallax, *Lioceras*, p. lxxviii
 Family, 14, cxcviii
 fasciata, *Geyeria*, Suppl., Pl. 6, figs. 7-10, p. 1
 fascigera, *Haugia*, Pl. 25, fig. 7, p. 156 (*Haugia Eseri*); Suppl., p. xxix
 fastigata, *Braunsina*, Suppl., Pl. 20, figs. 1-3, p. c
 Fastigate, 411, iv; see also concavifastigate, convexifastigate, planifastigate
 Fastigation of periphery, in relation to development, lxvii
 Fauna, Ammonite, independent of lithic conditions, xvi; of hemera, extension of, xvi; richness of, cxcix
 Favre, on classification of Ammonites, 11
 Ferruginous beds, 7, 43
 Feuguerolles, lv, lvii, lix, lxxii, clxxi
 fidicula, *Pholadomya*, 46, 48
 fimbriatum, *Lytoceras*, cc
 fissilobata, *Sonninia*, 328
 fissilobata-ovalis horizon, date of, ccvii
 Fissilobati, 287
 flaccidum, *Graphoceras*, Pl. 8, figs. 7, 8, p. 56 (*Lioceras concavum*); Suppl., Fig. 60 in text, p. xcvi
 Flexicostate (series), *Fontannesia*, clxxxix
 flexilis, *Ludwigella*, Suppl., Pl. 19, figs. 28-30, p. lxxxviii
 Flexiradiata (*Pseudogrammoceras* series), cxliv
 Flexiradius, iii
 floccosa, *Paquieria*, Suppl., Pl. 10, figs. 20-24, p. lxvii
 fluens, *Pleydellia*, Pl. 31, figs. 1, 2, p. 176 (*Grammoceras mactra*); Suppl., Fig. 114, p. clxv; p. cxxxvii
 fluitans, Ammonites, 190
 fluitans, *Grammoceras*, Pl. 30, figs. 1, 2, p. 190, see folleata, *Canavarina*
 fluitans, *Grammoceras*, 222, cxli; *Harpoceras*, 190, 191
 folleata, *Canavarina*, Pl. 30, figs. 1, 2, p. 190 (*Grammoceras fluitans*); Suppl., Fig. 128, p. clxvii; p. cxli
 Fontannes, F., and *Fontannesia*, clxxxvii; see also *Dumortier & Fontannes*

- Fontannesia**, p. clxxxvii; *aurita*, *boweri*, *carinata*, *concentrica*, *curvata*, *despecta*, *explanata*, *luculenta*, *grammoceroïdes*, *obruta*, *tortiva*
- Fontannesia**, classification, cxcviii
- Fontenay-le-Pesnel**, clxxiv
- Forbesi**, *Rhynchonella*, 9, 63
- Form**, similarity of, hiding septal differences, 379
- Formenreihen**, 127
- formosum**, *Depaceras*, Pl. 10, figs. 1, 2, p. 65 (*Lioceras concavum* var. *formosum*); Suppl., Fig. 38 in text, p. lxxix
- Formula** for species, 382
- Fossil bed**, meaning of term, ccix
- Fossil beds**, dates of, ccvi, ccvii
- Fossiliferous**, deposit, 455; horizon in sands, clxxxiii
- Fossilisation**, conditions of, 455
- Fossils**, distinctive, ccv
- France**, 208, 215, 220, clxxviii, clxxx, cxciii
- Frantzi**, *Ammonites*, 112
- Fredericii**, *Ammonites*, 227, 230
- Freestone**, Building, 7; date of, ccvi; Upper, 7; Lower, date of, ccvii; meaning of term, ccix; Upper, date of, ccvii; see Building, Lower, Notgrove, Upper Freestone
- Fridericii**, *Ammonites*, 180; *Pelecoceras*, 180
- Frith Quarry**, 90, 94, 96, 100, civ
- Frocester**, 19, 40, 41, 49, 50, 113, 114, 179, 185, 188, 191, 194, 196, 197, 212, 213, xvi, xlii, cxxix, cxlix, cliii, clxix, clxxxi, cxxxiii, cxxxiv, cxxxv, cxxxvi, cxxxvii; strata of, ccix
- Frocester Hill**, Oppel's division of strata at, 2; sands of, and Pea grit, J. Buckman, 3; geology of, 44; Cotteswold Sands at base of so-called Inferior Oolite, v; Bugstone at, ccvii
- Frocester district**, strata of, ccviii
- Frodgen Quarry**, 292, 306, xcvi
- furcatum**, *Lopadoceras*, Suppl., Pl. 21, figs. 16-18; p. cxii
- furcillata**, *Reynesia*, Suppl., Pl. 22, figs. 1-3; p. civ
- Fullers' Earth Clay**, 6
- Furrows**, 134
- Furzey Knaps**, Yeovil, Somerset, clxxii, clxxiv
- fusca**, *Oppelia*, *hemera*, ccv
- Fuscae hemera**, vi; strata of, ccvi
- futilis**, *Braunsina*, Pl. 15, figs. 7, 8; p. 76 (*Lioceras apertum*); Suppl., Fig. 64 in text, p. ci
- G 4, ccv
- G 5, ccv
- *gallica**, *Kiliania*?, Suppl., p. lxxviii (Foreign)
- Gammiradiata**, cxxx
- Garantiana**, *Parkinsonia*, 272; ontogeny of, 271
- Garantianæ hemera**, vi, strata of, ccvi
- Garantianum**, *Cosmoceras*, 10; *Strenoceras*, *hemera*, ccv
- Garda See**, 452
- Gasteropoda**, 47; *Pleuroceras* used for, 258
- Gasteropods**, sinistral, at East Coker, 7
- Gawan**, A., 31, 151
- Gemmellaro**, Prof. G. G., 272, 276
- Genealogy** (Table II), 131; (Table III), *Hildoceratidæ*, 132; of *Polymorphidæ*, Haug's views thereon criticised, 234; remarks on *Ammonite*, 444; methods of, 444; (Table IX), *Sonniniæ*, 445; is an attempt to interpret characters, 446; homœomorphous species, 446
- Genera**, separation of *Sonniniæ* into, 450
- Generic**, classification, cxcvii; definitions, interpretation of, cciii; distinction, cxcix; group, 15; subgroups, 15
- Genetic acme**, cc
- Genotype**, cciii
- Genus**, view concerning, cciv
- Geological**, characters, 2-10; range of *Grammoceras*, 162; position, *Sonniniæ*, 292; position, *Lillia-Haugia*, xii; phenomena, xii; details, cciv
- Geological Survey**, ccv; **Museum** of, 178
- Geology**, sections, 164; see **Geological**
- Germani**, *Lytoceras*, 165
- Gerontic**, 357; form, clix
- Gervillei**, *Sphæroceras*, 120
- Geyer**, Dr. G., and *Geyeria*, 1
- Geyeria**, Suppl., p. 1; *evertens*, *fasciata*
- Geyeria**, classification, cxcviii
- Giant** of Inferior Oolite, cc
- gibbera**, *Sonninia*, Pl. 87, figs. 4, 5; Pl. 88, figs. 1-3; Figs. in text, 22, p. 390; 48, p. 420; 74, p. 443; p. 421
- Giebel**, 216

- gigantea**, Wiltshireia, Pl. 11, fig. 1; Pl. 12, fig. 4; Pl. A, fig. 12, p. 25 (*Lioceras bradfordense* var. *giganteum*); Suppl., Pl. 11, fig. 31; Pl. 15, figs. 7, 8; p. lxxviii
- giganteum**, *Lioceras*, 26
- glevensis**, *Ludwigella*, Suppl., Pl. 20, figs. 25–27, p. lxxxix
- globata**, *Terebratula*, 7, 45, 165
- Globose stage**, examples of, 289
- globosus**, *Ammonites*, 289; *Cymbites*, 268, 283
- Gloucestershire**, 2, 3, 6–9, 19, 22, 30, 37, 42, 50, 53, 94, 96, 97, 107, 113, 147, 158, 173, 179, 208, 220, 229, 247, 275, 279, 281, xv, xvi, xxi, xxii, xxiv–xxix, xxxi–xxxiii, xlv, xlv, l, lviii, lxxv, lxxvi, lxxix, c, civ, cx, cxxi, cxxix, cxxx, cxxxiii–cxxxvii, cxxxix, cxliii, cxlv–cliii, clviii–clxi, clxx–clxxiii, clxxv, clxxvii–clxxxi, clxxxv–clxxxvii; sections, 41; strata of, ccvi–ccix
- Goniote stage**, 159, 170, 173
- Gottsche**, 148, 273, 453, vi, viii, clxx; on *Harporceras Andium*, 157
- gracile**, *Lioceras*, Suppl., Pl. 6, figs. 11–13, p. xxxviii
- gradata**, *Ludwigia*, Suppl., Fig. 27, p. lxxi
- gradatum**, *Pseudolioceras*, Pl. 20, figs. 3, 4, p. 85 (*P. compactile*); Suppl., Fig. 159, p. clxvii; p. clviii
- gradumbilicate**, iv, v; species, relation to concavumbilicate, xcviii
- Grammoceras**, p. 158; Suppl., p. cxxxix; *aalense*, *acutum*, *antiquum*, *audax*, *bingmanni*, *capillatum*, *costulatum*, *cotteswoldiae*, *dispansum*, *distans*, *doerntense*, *eseri*, *fallaciosum*, *f. var. bingmanni*, *f. var. cotteswoldiae*, *f. var. struckmanni*, *fluitans*, *kurrianum*, *leurum*, *lotharingicum*, *mactra*, *metallarium*, *moorei*, *muelleri*, *nannodes*, *nitescens*, *normannianum*, *orbignyi*, *ovatum*, *penestriatulum*, *radians*, *quadratum*, *sæmanni*, *serpentinum*, *sp.*, *striatulum*, *struckmanni*, *subcomptum*, *subquadratum*, *subserrodens*, *thouarsense*, *toarcense*, *toarcense-striatulum*, *toarciense*
- Grammoceras**, 12, 13, 127, 129, 221, 222, 223, 284, 379, cxxix; from *Haugia*, 144; geological range of, 162; works specially dealing with, 169; horizon of, wanting between Stroud and Yorkshire, 175; and *Haugia*, remarks on, 221; from *Dumortieria*, 232; and *Arietan* stage, 233; and *Dorsetensia*, 305; from *Cotteswoldia*, cxxxiii; from *Canavarina*, cxli; classification, cxcviii
- Grammocerata**, 52, 222; hollow carinate, 200; genealogy and horizons of (Table IV), 221
- Grammoceratan stage**, 159
- Grammoceratinae**, classification, cxcviii
- Grammoceratoid**, cxxix
- grammoceroides**, *Dumortieria*, Pl. 46, figs. 1–3, see **grammoceroides**, *Fontannesia*; Pl. 46, figs. 4, 5, 8, *luculenta*, F.; Pl. 46, figs. 6, 7, *explanata*, F.; Pl. 47, figs. 1–5, *curvata*, F.; Pl. 47, figs. 6, 7, *despecta*, F.; Pl. 47, figs. 8, 9, *tortiva*, F.; Pl. 47, figs. 10–12, *luculenta*, F.; Pl. 47, figs. 13, 14, *carinata*, F.; Pl. 47, figs. 15–17, *grammoceroides*, F.; Pl. 65, figs. 6, 7, *curvata*, F.; p. 262, see spp. above
- grammoceroides**, *Dumortieria*, 339, 340, clxxxviii, clxxxix, cxc; morphological equivalent to, 334; resemblance to *Sonninia*, 235, 340; involute senescent development of, notes on, 340
- grammoceroides**, *Fontannesia*, Pl. 46, figs. 1–3; Pl. 47, figs. 15–17, p. 262 (*Dumortieria grammoceroides*); Suppl., Fig. 186, p. cxcvi; p. clxxxviii
- grandis**, *Haugia*, Pl. 23, figs. 14, 15 (*Haugia variabilis*); Pl. 24; Pl. 25, fig. 1; Pl. 28, figs. 1–3, p. 149 (*Haugia jugosa*); Suppl., Pl. 2, fig. 11; p. xxvi
- Graphoceras**, Suppl., p. xcv; *decorum*, *debile*, *flaccidum*, *limitatum*, *inclusum*, *mirabile*, *robustum*, *stigmatosum*, *undulatum*, *v-scriptum*
- Graphoceras**, cci; from *Braunsina*, xcix; classification, cxcviii
- Graphoceratinae**, classification, cxcviii
- grave**, *Lioceras*, Suppl., Pl. 8, figs. 4–6, p. xli
- Great Oolite**, 47
- Gregorio**, de, 277, 278
- Group**, *fallaciosum*, 163; *striatulum*, 163
- Groups** (*Ammonite*), 127; (*Lioceras*), xxxvi
- Growth**, acme, cc; individual, cc
- Growth-lines**, ii
- Grunowi**, *Ammonites*, 201, cxliv
- Gruppe**, see **Groups**
- Gryphite grit**, 7, ccix; and *Dorset Cephalopod* bed, 3; *Ammonites* of, at Stroud, 90; age of, 91; date of, ccvi

- Greek bow, radial line like, lxxix
 Guibali, Ammonites, 226
 Gundershofen, 187, 258
 Gyroceras, cci
 Gyroceratan, ccii
- Halfway House, 8, 19, 34, 61, 62, 67, 71, 73, 75, 99, 103, 106, 266, 322, 324, 343, liv, lviii, lxxv, lxxix, lxxxi, lxxxiv, lxxxv, lxxxvii, ci, cxxviii, clxxxviii, clxxxix, cxc, cxci; Parkinsoni zone fossiliferous at, 10; strata of, ccvi, ccvii
 Ham Hill, 251; position of Freestone beds at, 52; strata of, ccviii
hamatum, Depaceras, Suppl., Fig. 37 in text, p. lxxix
 Hamites, 14
 Hammatoceras, 13, 14, 53, 129, 157, 226, 287, 294, 313, 314, 316, 378, 379, 452; adicrum, amaltheiforme, climacomphalum, insigne, occidentale, ogerieni, patella, pertinax, pugnax, sowerbyi, variable; (Sonninia) andium, ogerieni, polyacanthum; species of, Opalinum zone of Northampton and Dorset, 53; from Haugia, 144; loss of marginal knobs, 157; from Sonninia, 314; spinose species of Sonninia confounded with, 342; from Fontanesia, clxxxviii
 Hammatocerata, migration of, 452; great abundance near Mediterranean, 452; sandstone yielding, ccviii
 Hammatoceratidæ, 15, 16
 Hammatoceratinæ, 15
 Hanbury quarry, 96
 Hanover, 88
 Haploceras, 14
Haplopleuroceras, p. 299; mundum, subspinat
 Haplopleuroceras, 290, 314, cxcii; from Dorsetensia, 303; and Zurcheria, cxcii; classification, cxviii
 Haresfield, compared with Burton Bradstock, 51
 Haresfield Beacon, 182
 Haresfield Hill, 36, 40, 41, 42, 49, 51, 55, 56, 88, 163, 179, 181, 191, 194, 196, 197, 198, xlv, xlvi, l, cxxxiii, cxxxv, cxxxvi, cxxxix; Opalinum zone at, Wright's remarks on, 4; section of, 43; correlation, correction, 166; Grammoceras striatulum at, correction of, 175; strata of, ccviii
- Haresfield-Wotton district, 166
 haresfieldensis, Terebratula, 44, 164, 269
 Harford Sands, date of, ccvii
 Harpoceras, 5, 13, 14, 38, 82, 84, 127, 129, 130, 158, 217, 223, 287, 302, 313, cci; aalense, actæon, adicrum, alsaticum, andium, arietiforme beyrichi, boweri, canaliculatum, compactile, comptum, concavum, cornu, corrugatum, costula, cycloides, desori, discoides, dispansum, dumortieri, edouardi, edouardianum, elegans, elmagum, eseri, falciferum, fallaciosum, fluitans, hecticum, henrici, kurrianum, lessbergi, levesquei, lotharingicum, mactra, lythense, masceanum, moorei, munieri, murchisonæ, m. var. bradfordiense, nitescens, occidentale, ogerieni, opalinum, pseudoradiosum, radians, radiosum, sinon, sowerbyi, sp., steinmanni, strangwaysi, striatulum, s. var. comptum, subcomptum, subplanatum, subundulatum, s. var. externe-comptum, s. var. externe-costatum, s. var. externe-punctum, trimarginatum, variabile, zio, zitteli; (Dumortieria) costula; (Pseudolioceras) compactile; zone, 4; for true Falciferi, 38; restriction of generic term, 39; from Pseudolioceras, 83; characters of, 138; from Haugia, 144; from Polyplectus, 214; type species of, xxxiii; from Pseudogrammoceras, cxliv; from Vacekia, clvi; from Polyplectus; clvii; from Pseudolioceras, clviii
 Harpoceratan Age, ccv
 Harpoceratidæ, 126, 127, 287
 Harpoceratinæ, 14, 15, 16, 287
 Harpoceratites, 287
 Haselbury, 19, 29, 30, 40, 55, xlvi, lvii, lxvii, lxix, lxxi; sands at, 51; strata of, ccvii
 Hauer, F. R. von, 115, vii, viii, xii, xiii, xiv, xviii
 Haug, Dr. Emile, 12, 14, 17, 20, 35, 53, 56, 77, 83, 85, 86, 87, 97, 98, 108, 112, 114, 117, 118, 119, 120, 127, 128, 130, 138, 139, 143, 144, 146, 149, 154, 155, 157, 160, 161, 170, 177, 186, 187, 190, 192, 193, 198, 199, 201, 203, 205, 211, 215, 220, 227, 231, 232, 234, 236, 237, 238, 239, 240, 241, 242, 243, 244, 246, 248, 250, 252, 253, 254, 256, 257, 258, 259, 260, 261, 262, 267, 268, 269, 270, 272,

- 274, 276, 277, 279, 283, 285, 286, 287, 288, 295, 297, 302, 304, 313, 357, 375, 376, 452, viii, xiii, xiv, xviii, xxviii, xxxvi, lxx, cxliv, clxxv, clxxix, cxcii; on *Harpoceratidæ*, 12; on *Am. serpentinus*, 13; on *Harpoceras*, 16; on *Lioc. opalinum*, 53; on *Harp. opalinum*, 54; and *A. compactilis*, 86; remarks on *jurense*-zone, 114; on *Harpoceras falciferum*, 128; on *Dumortieria Jamesoni*, 130; on *Ludwigia*, 138; on *Pseudolioc. compactile*, 139; and *Am. Eseri*, 143; and *Am. occidentalis*, 144; on *Haugia Eseri*, and *occidentalis*, 154; and *Ammonite* convergence, 177; and *Grammoceras radians*, 186; on *Am. aalensis*, 194; on *Dumortieria Munieri*, 238; on *Dumortieria*, 239; and *Gundershofen*, 258; and *Harp. subcomptum*, 261; on *Polymorphidæ*, 265; and *Polymorphites*, 268; on *Leesbergi*, 279; and *Ludwigia Haugi*, lxx; and *Gram. fluitans*, cxli; and *Dumortieria grammoceroïdes*, clxxxviii; correction by, cxcii
- Haugi*, *Hildoceras*, 17
- haugi*, *Ludwigia*, Suppl., Pl. 14, figs. 8–10, p. lxx
- Haugi*, *Ludwigia*, 17
- Haugia*, pp. 45, 142; Suppl., p. x, xxii; *compressa*, *dumortieri*, *eseri*, *eseri*, *fascigera*, *grandis*, *illustris*, aff. *illustris*, *illustris*, *inæqua*, *jugosa*, *navis*, *occidentalis*, *ogerieni*, *patelliformis*, *sculpta*, sp., *variabilis*, aff. *variabilis*
- Haugia*, 82, 207, 226, clxix; and *Grammoceras*, remarks on, 221; from *Dorsetensia*, 309; characters, vi; from *Chartronia*, xvi; from *Phymatoceras*, xxx; from *Pseudogrammoceras*, cxliii; classification, cxviii
- Haugia*, *Lillia*-, series, vi; species of, vi, viii; works on, vii; characters, viii; classification, ix; geological position, xii; *hemeræ* of, xii
- Hauginæ*, classification, cxviii
- haukerensis*, *Ammonites*, 289; *Pleuroceras*, 291, 295, 299, 301
- hectica*, *Ludwigia*, 128
- Hectici*, 132, cxiv
- hecticus*, *Ammonites*, 127
- hecticum*, *Harpoceras*, 13
- Hemera*, a period of time, 447; importance of the *hemeral* system, 452; a chronological unit, v
- Hemeræ*, list of, vi; strata of certain, xxxv; of *Pseudogrammocerata*, cliv; *aalensis*, *acuti*, *bifrontis*, *blagdeni*, *bradfordensis*, *coarctatæ*, *concavi*, *disci*, *discitæ*, *dispansi*, *Dumortierie* sp., *falciferi*, *fusca*, *garantiani*, *lilli*, *maxillatæ*, *moorei*, *murchisonæ*, *niortensis*, *opalini-formis*, *sauzei*, *scissi*, *Sonniniæ* sp., *striatuli*, *struckmanni*, *subcontracti*, *truellii*, *variabilis*, *Witchelliæ* sp., *zigzag*
- Hemeral*, system, 452; classification, ccv; terms, ccv
- Henbury* quarry, 96
- Hendford* Hill, 237, clxxii
- Henley*-zone, 132, 283
- Henrici*, *Harpoceras*, 13
- Hereditary* force, 280
- Hervei*, *Ammonites*, 272
- heterogenum*, *Liparoceras*, 289
- Heteromorphous* species, cciv
- heterophyllum*, *Phylloceras*, 119
- Hiatus* between Upper Freestone and Gryphite grit, 64; between *Murchisonæ* and *Sowerby* zones, 64
- Hildoceras*, p. 111; Suppl., p. clvi; **bifrons*, *bifrons* var., *boreale*, *cornu*, *cycloides*, *douvilliei*, *kiliani*, *haugi*, *murchisonæ*, *quadratum*, *sæmanni*, *semipolitum*
- Hildoceras* (*Ludwigia*) *cornu*, 13, 14, 128, 129; from *Pæcilomorphus*, 115; furrows of, 135; from *Grammoceras* 160; classification, cxviii
- Hildoceratidæ*, 21, 81, 88, 101, 111, 115, 142, 158, i
- Hildoceratidæ*, 13, 129, 284, 314, cci; where to be used, correction, 101; remarks on family, 222; the compressed involute shape a necessity, 223; advantage of involute over evolute in the struggle for existence, 223; their tendency towards the compressed involute shape, 223; the early forms near the Mediterranean, 223; less modified successors ousting more changed predecessors, 223; constant immigration of waves of less modified species, 223; omission of stages, 224; new immigrants become like the older, 224; the less modified forms perpetuate the race, 224; revision of, additions to, i; supplementary description of species of, xiii; from *Polymorphidæ*, clxix; complication in, cxci; classification, cxviii

- Hildoceratinae, 15, 16, 21; read Hildoceratidae for, 81; classification, cxviii
- Hinton, 175
- Holandrei, Dactylioceras, 165
- Holm, lxx
- Hollandæ, Cosmoceras, 273, 275
- hollandæ, Tmetoceras, Pl. 48, figs. 11, 12; p. 275**
- Hollow carina, 81, iv; and see carina
- Hollow carinate Grammocerata, 200
- Homœomorph, xlviii
- Homœomorphous, 368; fossils, examples of, 381; species, cciv
- Homœomorphs, examples, lxviii
- Homœomorphy, deceptions of, ii; case of deception of, clxxxii; of concavumbilicate species, xcvi
- Homogenous, 280
- Homoplastic, 280; developments, 272
- Hook Norton, 40, 52, 53
- Horethorne Down, 275; strata of, ccvii
- Horn Park, lix, lx
- Horizon, fossiliferous in Sands, clxxxiii; of Tmetoceras, clxx
- Hudleston, W. H., 47, 61, 63, 64, 119, 167, 168, 175, 188, 194, 225, 228, 229, 274, 374, xlviii; on Inferior Oolite, 4; on Burton Bradstock, 47; on Midford Sands, 51; and Concavum beds, 63; on Gasteropoda, 64; Concavum beds, 65; sent specimens, 228; and Sherborne excavations, 374
- Hudlestonia, p. 225; affinis, serrodens, sinon**
- Hudlestonia, from Dorsetensia, 309; classification, cxviii
- Hugia, Suppl., p. cxi; curva, micca**
- Hugia from Lopadoceras, cxii; classification, cxviii
- Humphriesianum, Stephanoceras, 5, 9, 63, 120, 272
- Humphriesianum-zone, 4, 6, 8, 9, 63, 64, 119, 291-293; thickness of, fossils of, 10
- Humphriesianum-Sauzei-zone, 316
- Humphriesianus, Ammonites, 63
- Humphriesianus-zone, absence of, in Cotteswolds, 91
- Hyatt, Alpheus, 12, 13, 35, 111, 143, 146, 158, 159, 173, 192, 215, 225, 226, 232, 233, 234, 270, 280, 286, 289, 290, 312, 315, 357, xxx, xxxv, lv, cxxxi; on classification of Ammonites, 11; on genera of Ammonites, 12; on Ammonites, 13; and Tropidoceras, 14; lists of papers by, 160; on Pelecoceras, 225; and Ophioceras, 232; on pilæ, 233; and Amaltheidae, 290; on absorption of living chamber, 312; on Phymatoceras robustum, xxx; and Hyattia, lv; and Arietidae, cxix
- Hyattinae, classification, cxviii
- Hyattia, Suppl., p. lv; bullifera, pustulifera, subcava, wilsoni**
- Hyattia, from Manselia, lviii; classification, cxviii
- Hyattina, Suppl., p. lvii; brasili, sp.**
- Hyattina, from Manselia, lviii; from Apedogyria, lix; classification, cxviii
- Hyperlioceras, p. 88; Suppl., p. cxxi; curvicoatum, deflexum, desori, *discites, discites, discoideum, discitiforme, liodiscites, lucyi, occlusum, rudidiscites, subdiscoideum, subleve, walkeri**
- Hyperlioceras, 223, 447, iv; from Dorsetensia, 309; from Toxolioceras, cxxvi; ancestor not Pseudolioceras, clviii; classification, cxviii
- Hypostrophic, 357; characters, association of, lxxii; abnormality, xcvi
- Hypostrophy, signs of, clx
- Ibex zone, 132, 283
- Identification, necessity of noting small differences in young specimens, 426; necessity of correctly measuring umbilicus in young specimens, 440; obscure characters must be attended to, 451
- idoneum, Deltoidoceras, Suppl., Fig. 80 in text, p. cxvii**
- ignobilis, Ludwigia, 128
- illustris, Ammonites, 153, vii, xi; (Hammatoceras), 153, xxvi, xxvii
- illustris, Haugia, Pl. 26, figs. 3-5, p. 153, see aff. illustris, H.*
- illustris, Haugia, Suppl., pp. xxvi, xxvii**
- aff. illustris, Haugia, Pl. 26, figs. 3-5, p. 153** (Haugia illustris); Suppl., p. xxvii
- illustris, Haugia, xxvii
- Ilminster, 175, 213, 231, xxii, xxv, xxvi, lxxxvi, cxliv; Oppel's statement about Ammonites in Sands at, 50; and Yeovil, lxxxvi; concavum strata distant from, lxxxvi; strata of, ccviii, ccix

- impendens*, Ammonites, 226
impolita, Ludwigella, Suppl., Pl. 19, figs. 25-27, p. lxxxv
inæqua, Haugia, Pl. 25, figs. 5, 6, Pl. A, fig. 37, p. 156 (*Haugia eseri*); Suppl., p. xxix
inæqua, Sonninia, Pl. 101, figs. 4-6, pp. 386, 400
Inæquiornate, iv, x
Incoiling, clv
incisum, Toxiloceras, Suppl., Pl. 21, figs. 31-33, p. cxxvi
inclusa, Dumortieria, Pl. 45, figs. 13, 14, p. 254 (*Dum. radiosa* var. *gundershofensis*); p. clxxx
inclusum, Graphoceras, Suppl., Pl. 15, figs. 15-17, p. xcvi
inconstans, Zurcheria, Pl. 50, figs. 4-10, p. 297
Indo-Pacific province, 454
Inferior Oolite, its limits, 2; division, Deslongschamp's views on, 4; to begin with Sauzei zone, 4; Hudleston's suggestion as to its division, 4; strata in Dorset differ in short distances, 8; thickness of, in South of England, 9; diminution westwards in Dorset-Somerset, 10; greatest thickness for South England expected near Sherborne, 10; maximum developments of, 10; and Opalinum-zone, 42; Limestone, 168; and Toarcien, 173; time of, divided into twenty-three hemeræ, v; deposits of, limits of, v; and acme, excix; giant of, cc; extent of; and upper Lias, cciv; (G5), ccv; Limestones, ccv; sands, 113, ccv
Inferior Oolite Series, 113, 175, ccv
inflata, Œdania, Suppl., Pl. 21, figs. 13-15, p. cviii
infra-oolithica, Terebratula, 52, xxxvii
Infra-Oolitic Marls, 4
Inheritance, Earlier, ccii; law of, 134, 224; theory of diminishing rate of progress, 224; modifying action, 288; partial or modifying action of, 290; unequal action of, 290; modified action, examples of, 295, 296, 297, 313; see development, tachygenesis
Inner margin, recession of, 36
inops, Reynesella, Suppl., Pl. 21, figs. 37-39, p. cx
Inornatilobate, v
Insigne group, 143
insigne, Hammatoceras, 13, 45, 46, 128, 143, 164, 165, 220
Insignes, 13
insignis, Ammonites, 13, 129, 279
insigni-simile, Catulloceras, Pl. 39, figs. 12-14, p. 278
insigni-similis, Ammonites, 278
insignoides, Sonninia, 315
Interlobular cells, 373
intermedia, Reynesia, Pl. 11, figs. 2, 3, p. 23 (*Lioceras decipiens* var. *intermedium*); Suppl., Pl. 18, fig. 27, p. ciii
intermedium, Ægoceras, 232
Intersection of ornament, cc
Intra-axial, 369
Inverted triangle, 360
Involution, how attained, 134
Ironshot, Bed, 293; beds, date of, ccviii; limestone, xxxv; limestone, date of, ccvii; marly stone, xxxv; Oolite, 63; Oolite, date of, ccvi; see White ironshot
Irregulari-ornate, iv, viii
irregularis, Sonninia, Pl. 61; Pl. 98, fig. 6; pp. 320, 389, 417
iserensis, Ammonites, xvii
iserensis, Denckmannia, Suppl., Pl. 2, figs. 1, 2, p. xvii
iserensis, Lillia, xvii
Isosceloid terminal lobule, 364
Italy, 220, clxx

Jackson, Dr. R. T., excix
Jamesoni, Ammonites, 234, 268, 283; and Polymorphites, Haug's opinion on, 268; Dumortieria, as ancestor of Levesquei, reasons against, 161
Jamesoni-zone, 132, 162, 221, 283
Java, 454
Jermyn Street Museum, 258, clxxxii
Jones, Prof. T. Rupert, and change of names, 286
Jorquera, Chili, 258
Judd, Prof. J. W., on Gryphite grit, 91; on locality of A. Murchisonæ, lxx
jugifer, Ammonites, 82
jugosa, Haugia, Pl. 23, figs. 11-13, p. 149; Suppl., p. xxv
jugosa, Haugia, Pl. 24, 25, fig. 1 (Pl. 28, figs. 1-3?) p. 149, see *grandis*, Haugia
jugosa, Haugia, x, xi, xii, xxvi; and H. variabilis, comparative dimensions, 150

- jugosus*, Ammonites, 149, vii, xi, xxv
juncta, Brodieia, Suppl., Pl. 4, figs. 7-9, p. xxii;
 see junctum, Brodiceras
juncta, Brodieia, xii
juncta, Reynesella, Suppl., Pl. 17, figs. 4-6, p. cix;
 Fig. 70, p. clxv
 Junction Bed, ccix
junctum, Brodiceras, Suppl., Pl. 4, figs. 7-9, p.
 xxxii (Brodieia *juncta*)
Jura, Brauner, 3; Schwarzer, 3; of Berne, 62
jurense, Lytoceras, 6, 44, 46, 50
jurense-zone, 6, 50, 51, 114, 163, 221, 222, 223,
 282, 291, xv
jurensis, Ammonites, 44, 49, 50, 51, 52; as British
 species doubtful, 50; zone of, 49
Jurensis, Bed, 2; Bett, 2
- Kilian, Prof. W., and Kiliania, lxiv
 Kiliani, Hildoceras, 112, 116
Kiliania, Suppl., p. lxiv; *armipotens*, **gallica*,
 laciniosa, *tuberata*
Kiliania, clxix; from Paquieria, lxvii; from Wilt-
 shireia, lxviii; from Ludwigia, lxix; from
 Lucya, lxxiv; classification, cxviii
 Knorr, 273
 Krause, Dr. P. G., Photographs supplied by,
 cxxxii
Kurrianum, Grammoceras, and fallaciosum, Gram.,
 relationship doubtful, 163; descent of latter
 from former, doubtful, 208
Kurrianum, Harpoceras, 127
Kurrianus, Ammonites, 132, 144, 216; and Poly-
 plectus discoides, suggestion about, 216
- L, 382, xix
 l, 382
La Porcarella, 220
La Verpillière, xvii, lxxiii, cxli
laciniosa, Kiliania, Suppl., Pl. 15, figs. 4-6; Fig.
 22a in text, p. lxv
laciniosa, Kiliania, Fig. 22, p. lxiv; *see murchisonæ*,
 Ludwigia
lævigata, Ludwigia, Suppl., Pl. 11, figs. 13-15, p.
 lxxi
lævigata, Sonninia, Pl. 82, figs. 5, 6; Pl. 101, figs.
 7-9; Pl. 103, fig. 9; pp. 356, 399
Lævigata, iv
Lævigatitabulate, cv
- lævis*, Darellia, Pl. 18, fig. 4, 5, p. 94 (Hyper-
 lioceras discites); Suppl., Fig. 74, p. clxv;
 Fig. 75, p. cxiii
**læviuscula*, Witchellia, Pl. A, fig. 47
læviuscula, Witchellia, 82
læviusculus, Ammonites, doubtful identification,
 53; comfounded with Hyperlioceras, etc., 91
Lamellibranchiata, 45
Langheim, ornatus beds of, as locality for Am.
 mæandrus, xl
lata, Dumortieria, Pl. 44, figs. 1-3, p. 252 (Dum.
 radians var. *exigua*); Suppl., Fig. 183, p.
 cxvii; p. clxxxiii
Latangulate radial line, cvi
Lateral auricles, Fontannesia, clxxxix
Lateral lobules, 364
lutescens, Dumortieria, Pl. 43, figs. 8-10, p. 259
 (Dum. subundulata, var.); Suppl., Fig. 185,
 p. cxvii; p. clxxxv
Lutescens series (Dumortieria), clxxxiv, clxxxv
Latilobate (series), lxiv, lxvi
Latisellati, 126
Latissept, 111, cc
latum, Platygraphoceras, Suppl., Pl. 20, figs. 19-
 21; p. xciv
Latumbilicate, v, cxvii
Latumbilicate and catagenetic species, cliv
Law of earlier inheritance, *see Inheritance*, earlier,
 law of
laxa, Reynesia, Pl. 11, figs. 6, 7, p. 23 (Lioceras
 decipiens var. *intermedium*); Suppl., Pl. 18,
 fig. 28, p. ciii
Le Bernard, cxxxiv, clxxviii, clxxx
Le Moulin Drapeau, cxxxiv
Leachii, Cirrus, 7
Leckhampton, strata of, cvi
Leckhampton Hill, 7, 19, xxxix, lviii, lxvi; rubbly
 oolite compared, 3; opalinum zone absent
 (Wright), 7
Leda-ovum beds, Upper, Mr. Thompson's remarks
 on; date of, xv; date of, ccix
Leesberg and Leesbergi, 279
leesbergi, Catulloceras, Pl. 39, figs. 10, 11, p.
 279; p. clxxi
Leioceras, 13, 127; discoides, opalinum
lenis, Braunsella, Pl. 7, figs. 5, 6, p. 26 (Lioceras
 ambiguum); Suppl., Pl. 17, fig. 32, p. cii
lenis, Braunsia, cii

- Lennieri, Dorsetensia**, Pl. 52, figs. 1-3, p. 304 (Dorsetensia sp. A); p. cxcii
- lepada, Reynesia**, Pl. 11, figs. 4, 5, p. 23 (*Lioceras decipens* var. *intermedium*); Suppl., Pl. 18, fig. 29, p. civ
- Lepsius**, 35, 253
- lepta, Œdania**, Suppl., Pl. 21, figs. 4-6, p. cviii
- Leptogyral**, iii, cxcvii
- Lessbergi, Dumortieria**, 279; *Harpoceras*, 279
- leura, Pleydellia**, Pl. 33, figs. 5-10, p. 195 (*Grammoceras leorum*); Suppl., Figs. 115, 116, pp. clxv, clxvii; p. cxxxviii
- leorum, Grammoceras**, Pl. 33, figs. 5-10, p. 195; see **leura, Pleydellia**
- leorum, Grammoceras**, 222, 223, cxxxviii
- Levesquei, Ammonites**, 232, 241, 281; and *Fontannesia*, clxxxviii
- Levesquei, Dumortieria**, Pl. 37, figs. 6-8; see **sub-solaris, D.**
- Levesquei, Dumortieria**, Pl. 45, figs. 15, 16, sp. **Dumortieria**; p. 241, see spp. above
- Levesquei, Dumortieria**, 161, 162, 172, clxxiv, clxxvi; Haug's descent of, noticed, 161
- Levesquei, Harpoceras**, 241, 262
- Levigation pronounced (series)**, ci
- Levisoni, Ammonites**, 203; *Hildoceras*, 112
- Lias**, to end with Jurense zone, Deslongschamps, 4
- Lias, Lower**, 230
- Lias and Inferior Oolite**, same species of *Ammonites* in, how error caused, 175
- Lias and Oolite**, opinions on, 2
- Lias and Oolite division**, Wright, 44
- Lias and Oolite**, division between, 42
- Lias, Middle**, xv, c
- Lias-Oolite division**, question of, 2
- Lias-Oolite**, xv
- Lias Sands**, 3
- Lias, Upper**, 4, 7, 44, 46, 47, 48, 133, 168, 173, 175, xii
- Lias, Upper, Clay, Sands, and Cephalopod-beds**, same species in, how error arose, 175
- Lias, Upper, Clay of Down Cliffs**, note on, 251
- Lias, Upper, Clay and Cotteswold Sands**, clvi
- Lias, Upper, Clay and Dumortieria**, clxxxiii
- Lias, Upper, and Inferior Oolite**, ccv
- Lias, Upper**, date of, cviii, ccix
- Lias, Upper, Clay**, date of, ccviii
- Liassic rocks**, xl
- liassicum, Ægoceras**, 232; *Caloceras*, 236
- liassicus, Ammonites**, 201
- Liassien**, 173
- lilli, Ammonites**, 109, vii, ix, xiv
- Lilli hemera**, vi, xii, xv, cliv; strata of, ccix
- lilli, Lillia, Suppl.**, Pl. 1, figs. 1-6, p. xiv
- Lilli, Lillia**, 109, vii, ix; (*hemera*), ccv
- Lillia**, p. 108; Suppl., pp. ix, xiii; bayani, comensis, iserensis, lilli, narbonensis, sulcata
- Lillia**, 108, 127, 128, 129, 221, clxix; from *Hildoceras*, 112; from *Pœcilomorphus*, 115; from *Haugia*, 144; characters, vi; from *Chartronia*, xvi; from *Denckmannia*, xvii; from *Haugia*, xxii; from *Phymatoceras*, xxx; distinction from *Gammiradiata* species, cxxx; from *Grammoceras*, cxxxi; from *Pseudogrammoceras*, cxliii; classification, cxviii
- Lillia-Haugia series**, vi; species of, vi, vii; works on, vii; characters, viii; classification, ix; geological position, xi; *Hemeræ* of, xii; the non-tuberculate or *Eseri* group, xxviii
- Lima toarcensis**, 45, 46
- limatula, Cotteswoldia**, Pl. 30, figs. 5-7, p. 176 (*Grammoceras mactra*); Suppl., Fig. 106, p. clxv; p. cxxxiv
- limatum, Pseudographoceras**, Suppl., Fig. 54, p. xcii
- Limestone, Lower, Beds**, 7, 43, v
- Limestone, ironshot**, xii; date of, xxxv
- Limestone and Marl beds**, date of, ccvii
- Limestone, sandy ferruginous**, xxxv; and see sandy ferruginous beds
- Limestones, upper**, date of, ccvi; above the *Clypeus Grit*, date of, ccvi
- limitatum, Graphoceras**, Pl. 9, fig. 7; Pl. 10, fig. 7, p. 68 (*Lioceras concavum* var. *v-scriptum*); Suppl., Pl. 15, fig. 22, p. xcvi
- linearis, Dumortieria**, Pl. 30, figs. 15-16, p. 255 (*Dum. Moorei*); Suppl., Fig. 181, p. cxevi; p. clxxxiii
- lineata, Reynesella**?, Suppl., Pl. 17, figs. 25-27, p. cx
- lineatum, Lioceras**, Suppl., Pl. 8, figs. 1-3, p. xl
- lineatus, Ammonites**, 253
- Linguiform figures on periphery**, cxcii
- Lioceras**, p. 21; Suppl., p. xxxv; *ambiguum*, a. var. *costatum*, *apertum*, *bradfordense*, b. var. *giganteum*, *bifidatum*, *concavum*, c. var. *formosum*, c. var. *pingue*, c. var. *v-scriptum*,

- costatum*, *costosum*, *decipiens*, *d. var. intermedium*, *d. var. simile*, *elegans*, *fallax*, *giganteum*, *gracile*, *grave*, *intermedium*, *lineatum*, *opalinum*, *opalinum*, *o. var. comptum*, *partitum*, *pingue*, *plectile*, *plicatellum*, *simile*, *sp.*, *striatum*, *subcostosum*, *thompsoni*, *uncinatum*, *uncum*, *undulatum*, *v-scriptum*
- Lioceras, 12, 14, 127, 129, 223, xlii, xliii, lxviii, lxxx, xcv; opalinum selected as type of genus, 12; from Ludwigia, 16; from Pseudolioceras, 83; from Hyperlioceras, 89; and Opalinoid Ammonites, xxxiii; history of, xxxiii; the genus, and Opalinoid Ammonites, remarks on, xxxiii; the type of, xxxiv; contrasted with Cypholioceras, xxxiv; definition of (amended), xxxv; literature of; correction of; costate spp. of, xxxvi; costate-striate species of, xxxviii; striate spp. of, xl; renovate spp. of, xlii; foreign spp. of, xliii; from Cypholioceras, xliii; from Ancolioceras, xlvii; from Geyeria, 1; from Depaoceras, lxxvii; from Canavarella, cxxviii; classification, cxcviii
- Lioceratan stage, 159
- Lioceratoid genera, from Pseudolioceras, clviii
- Lioceratoid genus, cxxviii
- liodiscites, *Hyperlioceras*, Pl. 17, figs. 1, 2, p. 94 (H. discites); Suppl., Fig. 95; Fig. 96, p. clxv; p. cxxv
- liostraca, *Dorsetensia*, Pl. 53, figs. 11-16; Pl. 54, figs. 1, 2; Pl. 55, figs. 3-5; Pl. 56, fig. 1; p. 310
- liostraca group, 308
- liostraca, *Rhynchonella*, 63
- Liparoceras, ontogeny of, 289; capricornum, heterogenum, striatum
- Lissoceras, 14, 295
- Lissoceratidæ, 15
- Lissoceratinæ, 14, 287, 294
- literatum, *Pseudographoceras*, Suppl., Pl. 11, figs. 19-21, p. xci
- Lithic characters, xvi
- Little Sodbury, 40, 49, 175, xxviii, xxix, lxi, cxlvi, cliii; section, 164; strata at, 166; see Sodbury
- Littoral forms, 454
- Living chamber, absorption of, 312
- Lobe, accessory, 217, 219; archetype, 381; papilioniform, 368; siphonal, in *Amaltheus margaritatus*, 217
- Lobes, development of, 134; siphonal, 217; and saddles, 219; auxiliary, 219; changes in, 381; asymmetry of, etc., 382; skeleton, 443
- Lobules, 364
- Localities, for Polymorphidæ, clxix; foreign, for *Tmetoceras*, clxx
- loculosa, *Sonninia*, Pl. 92, figs. 5-7, pp. 391, 437
- locuples, *Sonninia*, Pl. 50, figs. 16-18 (19-22?) (*S. crassispinata*); Pl. 92, figs. 1-4, pp. 391, 431
- Longitudinal ornament, cc
- Lopadoceras, Suppl., p. xci; *arcuatum*, *euides*, *furcatum*
- Lopadoceras, from *Darellia*, cxiii; classification, cxcviii
- lotharingica, *Walkeria*?, Pl. 30, figs. 8, 9, p. 199 (*Grammoceras lotharingicum*); Suppl., Fig. 123, p. clxvii; p. cxl
- lotharingicum, *Grammoceras*, Pl. 30, figs. 8-10, p. 190, see *lotharingica*, *Walkeria*
- lotharingicum, *Grammoceras*, cxl; *Harpoceras*, 199
- Louse Hill, 34, 62, 67, 73, 103, 104, 120, 121, 266, lii, liv, lxi, lxxxv-lxxxvii, cxxix, clxxxviii, cxc; strata of, ccvii
- Lombardy, 220
- Long Wood, 242, 245, 279
- Lower beds, ccix; date of, ccvii
- Lower Inferior Oolite, ccv
- luculenta, *Fontannesia*, Pl. 46, figs. 4, 5, 8, p. 262 (*Dumortieria grammoceroïdes*); Pl. 47, figs. 10-12; p. clxxxix
- Lucy, W. C., and Lycett's MS., 37; and lucyi, 106; and Lucya, lxxiv; collection, lxxv
- Lucya, Suppl., p. lxxiv; *caduceifera*, *caducifera*, *cavata*, *magna*, *marginata*
- Lucya, from *Depaoceras*, *Paineia*, lxxiv; from *Paineia*, lxxvi; from *Depaoceras*, lxxvii; akin to *Brasilia*, lxxxi; suggested relationship to carinatitabulate forms, cxiv; classification, cxcviii
- lucyi, *Hyperlioceras*, Pl. 21, figs. 3, 4, p. 104 (*Ludwigia lucyi*); Suppl., Fig. 91; Fig. 92, p. clxv; p. cxxiii
- Lucyi, *Ludwigia*, Pl. 21, figs. 3, 4, see lucyi, *Hyperlioceras*; Pl. 21, figs. 5, 6, *tabulatum*, *Dissoroceras*; Pl. 21, figs. 7-9, *fallax*, *Depaoceras*; Pl. 21, figs. 10, 11, *caduceifera*, *Lucya*; p. 104, see spp. above

- Lucyi, *Ludwigia*, lxxv, lxxviii, cxv, cxxiii
 Lucyinæ, classification, cxviii
Ludwigella, p. lxxxiv; *arcitenens*, *arcuata*, *attenuata*, *attracta*, *blanda*, *callosa*, *carinata*, *casta*, *concava*, *cornu*, *flexilis*, *glevensis*, *micra*, *impolita*, *modica*, *nodata*, *opaca*, *rudis*, *rugosa*, *subobsoleta*, *subrudis*, *tenuis*, *vibrata*; classification, cxviii
Ludwigellæ carinatae, xc; *compressæ*, lxxxvii; *curvæ*, lxxxviii; *paucicostatae*, lxxxvii; *pingues*, lxxxix; *subrectæ*, xc; *veræ* (series), lxxxv
Ludwigia, p. 16; *Suppl.*, p. lxix; *aalensis*, *ambigua*, *baylii*, *cornu*, *corrugata*, *costosa*, *costula*, *gradata*, *haugi*, *hectica*, *ignobilis*, *lævigata*, *lucyi*, *mactra*, *murchisonæ*, *m. var. baylii*, *m. var. obtusa*, *obtusa*, *opalina*, *rudis*, *sinon*, *sp.*, *tuberculata*
Ludwigia, 127, 128, 129, 221, 223, 378, lxix, lxxiv, lxxxiv; from *Lillia*, 108; from *Hildoceras*, 112; from *Pœcilomorphus*, 115; from *Grammoceras*, 160; from *Rhæboceras*, lxxii; from *Crickia*, lxxviii; and *Hectici*, cxci; classification, cxviii
 Ludwigian Age, ccv
Ludwigina, *Suppl.*, p. lxi; *patula*, *umbilicata*
Ludwigina, from *Strophogyria*, lxii; classification, cxviii
 Lycett, Dr. J., 178, 185, 188, 189, 255, 256; MS. notes by, 37; on thickness of *Cephalopoda* bed, 42; and *Ammonites opalinus*, 54; on *Am. dispansus*, 211; remarks on *A. Moorei*, clxxxii, clxxxiii; see *Morris & Lycett*
 Lycetti, *Waldheimia*, 165
Lycettia, *Explan.* Pl. 52, misprint for *Dorsetensia lympharum*, *Ammonites*, cxix
 Lyncombe, 173, 175; *Cutting*, section, 165
lythense, *Harpoceras*, 127
lythensis, for *compactilis*, xxxiii
lythensis, *Ammonites*, 12, 85, 87, 155, 195, vii, clviii
 **lythense*, *Pseudolioceras*, *Suppl.*, fig. 158, p. clxvii
lythense, *Pseudolioceras*, 83
Lytoceras, 46; *confusum*, *fimbriatum*, *germaini*, *jurense*, *pygmæum*, *rubescens*, *sigalœn*, *sublineatum*, *torulosum*, *wrighti*
Lytocerata, 374, cc
Lytoceratidæ, 14
Lytoceratinæ, 289
macer, *Pœcilomorphus*, Pl. 22, figs. 23-29; Pl. A, fig. 33, p. 116
macrocephalus, *Ammonites*, 272
 **macrum*, *Catullocceras*, *Suppl.*, p. clxxiv
mactra, *Ammonites*, 176
mactra, *Grammoceras*, Pl. 30, figs. 3, 4, see *mactra*, *Pleydellia*; Pl. 30, figs. 5-7, *limatula*, *Cotteswoldia*; Pl. 31, figs. 1, 2, *fuens*, *Pleydellia*; Pl. 31, figs. 3, 4, *crinita*, *Cotteswoldia*: p. 176 see spp. above
mactra, *Grammoceras*, 164, 222, 284, cxxxiv, cxxxvii, cxxxix; a polygenetic series, 257; *Harpoceras*, 176, 255; *Ludwigia*, 176
mactra Pleydellia?, Pl. 30, figs. 3, 4, p. 176 (*Grammoceras mactra*); *Suppl.*, Fig. 119, p. clxvii; p. cxxxix
mactra-subserrodens, *Grammoceras*, 222
mæandrus, *Ammonites*, xl; *Nautilus*, xxxvi, xl; N., discussion of, xl
Maes Knoll, *Dundry*, cxlvi, cxlviii, clxxix; strata of, ccvi
 Maggs, T. C., collection, 108, 247; and *Cosmogyria Maggsi*, liv
Maggsi, *Cosmogyria*?, *Suppl.*, Pl. 10, figs. 23-28, p. liv
magna, *Lucya*, Pl. 6 (*Lioceras concavum*, var. A.); p. 68 (*L. concavum* var. v-scriptum); *Suppl.*, Fig. 32 in text; p. lxxvi
Magnilobate (series), lxiv
magnispinata, *Sonninia*, Pl. 76, figs. 1-6; Pl. 98, figs. 1-3; Figs. in text, 17, p. 388; 43, p. 412; 69, p. 443; pp. 341, 413
Magnispinata stock, 341
malagma, *Ammonites*, 225, vii, x, xxi
malagma, *Denckmannia*, *Suppl.*, Pl. 4, figs. 1-3 p. xx
 Malformation, 75
Mansel-Pleydell, J. C., and *Manselia*, lviii; and *Pleydellia*, cxxxvii
Manselia, *Suppl.*, p. lviii; *subacuta*, *subfalcata*, *trichina*
Manselia, classification, cxviii
 Mapperton, xlvi, li, lxiii, lxiv
 **margaritatus*, *Amaltheus*, Pl. 49, figs. 1, 2; p. 288
margaritatus, *Amaltheus*, 287, 291; suture line of, 217; zone, 133, 163, 283, 291
marginata, *Lucya*, Fig. 31 in text, p. lxxv

- marginata*, *Sonninia*, Pl. 62; Pl. 63, fig. 2; Pl. 65, figs. 1, 2; Pl. 96, fig. 6; pp. 321, 387, 407
marginata, *Sonninia*, Pl. 64, p. 321, see *regularis*, *Sonninia*
marginata, *Sonninia*, 395
Marl, argillaceous, 167
Marl Bed, 5; date of, ccvi; with green grains, 292
Marl Beds, limestone and, date of, ccvii
Malière, 64
marmorea, *Stokeia*, Suppl., Pl. 22, figs. 13-15; Fig. 99, p. clxv; p. cxxviii
Marston Road, 275, lix, lxi; strata of, ccvii
Martinsii, *Perisphinctes*, 10, 272
Mascke, E., remarks on *Dumortieria radiosa*, clxxx
Masseanum, *Harpoceras*, 13
Masseanus, *Ammonites*, 14
Matrix, variation of, advantage in noting it, 106; value of, greater than labels, 106; method of removal of, 413
maxillata, *Terebratula*, *hemera*, ccv
May-sur-Orne, lxxviii, lxx, lxxi, lxxiv
Mayer, C., 80, 228, lv, cxcv
Measurements, how taken, cxvii
Mediterranean, 220; abundance of *Hammatoceras* near, 452; borders, xiii
Mendip axis, and Dorset-Somerset basin, 249; and separation, clxxxviii
Mendips, 167
Meneghini, Prof. G., 112, 138, 170, 182, 189, 203, 204, 215, 216, 281, vii, viii, x, xi, xii, xviii
Meneghinii, *Catulloceras*, 281
Mercati, *Ammonites*, 115, 136; *Pœcilomorphus*, 116
Mercati-group, xiii
metallarium, *Grammoceras*, Pl. 36, figs. 1, 2, p. 210, see *metallarium*, *Phlyseogrammoceras*
metallarium, *Phlyseogrammoceras*, Pl. 36, figs. 1, 2, p. 210 (*Grammoceras metallarium*); Suppl., p. clv
metallarius, *Ammonites*, 210
Metamorphosis, 235
Metaplasia, 357
metita, *Dumortieria*, Pl. 42, figs. 11, 12, p. 248 (*Dum. radians*); Suppl., Fig. 173, p. cxevi; p. clxxviii
Micaceous Sands, 166, 167
micca, *Hugia*, Suppl., Pl. 21, figs. 28-30, p. cxi
micra, *Ludwigella*, Suppl., Pl. 19, figs. 7-9, p. lxxxix
Microderoceras, 129
Middle Inferior Oolite, ccv
Middle Lias, xv; species by mistake from, c
Middle Ragstones, ccix
Midford, *Parkinsoni* zone at, 51; sands at, 113; strata of, ccvi
Midford Sands, 3, 50, 51, 113, 167, 173, 175, 213; to include Yeovil and Cotteswold Sands, Woodward, 50; difficulty in correlation, 50; position of, 113; section, 165; contents, etc., of, 166; (G 4), ccv; date of, ccviii, ccix
Milborne Wick, 120, 305
Milhau, 208, 215, 216, 218, 219, 220, xvii, cxlviii, cxlix
Miller, 341
mirabile, *Graphoceras*, Suppl., Pl. 15, figs. 12-14, p. xcvi
misera, *Cotteswoldia*, Pl. 31, figs. 15, 16, p. 192 (*Grammoceras aalense*); Suppl., Fig. 108, p. clxv; p. cxxxv
miserabile, *Agassiceras*, 232, 268
miserabilis, *Ammonites*, 289
Missing link, 64
Misterton, 19, 40; strata of, ccvii
modesta, *Sonninia*, Pl. 68; Pl. 95, figs. 3-5; Pl. 96, figs. 1, 2; Pl. 103, fig. 5; Figs. in text, 23, p. 390; 49, p. 420; 75, p. 443; pp. 325, 422
modica, *Ludwigella*, Suppl., Pl. 19, figs. 37-39, p. xci
Modifications, 289
Moericke, W., remarks on a paper by, 452
Moesch, 89, 97
Monk, xc, cxvi
Moore, Charles, and Am. Moorei, 256
Moorei, *Ammonites*, 38, 246, 253, 255; Lycett on, 37, clxxxii; confusion about, 178; remarks concerning original specimen of, 256
Moorei beds, 164, 166, 167
Moorei and Opalinum beds, *Ammonites* of, probably absent from Yorkshire, 167
moorei, *Dumortieria*, Pl. 44, fig. 9, p. 255; Fig. 179, p. clxxxii
Moorei, *Dumortieria*, Pl. 30, figs. 15-17, see *sublinearis*, D.; Pl. 30, fig. 19, *subexcentrica*, D.; Pl. 44, figs. 4-6, see sp., D.; Pl. 44, figs. 7, 8, *subexcentrica*, D.; p. 255, see spp. above

- Moorei, Dumortieria, 164, 176, 177, 178, clxxxii, clxxxiii
- Moorei, Dumortieria, hemera, ccv
- Moorei, Grammoceras, 44, 52, 54; Harpoceras, 5, 6, 7, 37, 255
- Moorei hemera, vi; strata of, ccviii
- Morieri, Terebratula, 5
- Morphogenesis, cci; septal, ccii
- Morphic equivalent, cii
- Morphic equivalents, 444; necessity of comparing, 382; table of (Table 10), 449
- Morphic prefiguration, cciii
- Morphic representation, cc, cciii
- Morpho-, as prefix, 357
- Morphoceras, mode of growth compared, 263; expansion of umbilicus, ccii; dimorphism
- Morphogenesis, 357
- Morphogenetic acme, ccii
- Morphogeny, cc
- Morphological equivalence, case of, 295
- Morphological equivalents, 334, 339
- Morphological prefiguration, 315
- Morphological representation, 315
- Morris & Lycett, entombment of Ammonites, 446, 454
- Moulton, xv, xviii; strata of, ccix
- Mouth-border, 264, 454
- Mouth-borders figured, xxxiv
- Mouth-processes, 455
- Muelleri, Ammonites (Harpoceras), 209
- Muelleri, Grammoceras, Pl. 34, figs. 8, 9; Pl. 35, figs. 1-3, p. 209, see muelleri, Pseudogrammoceras
- Muelleri, Grammoceras, 222, cli
- muelleri, Pseudogrammoceras, Pl. 34, figs. 8, 9; Pl. 35, figs. 1-3, p. 209 (Grammoceras Muelleri); Suppl., Figs. 148; 149, p. clxvii; p. cli
- multicostata, Dumortieria, Suppl., fig. 168, p. clxxvi
- multicostata, Sonninia, Pl. 86, figs. 1-3; pp. 388, 410
- multispinata, Sonninia, Pl. 50, figs. 11-13; Pl. 103, fig. 3; pp. 317, 390, 425
- multispinata, Sonninia, 314, 315
- Multispinous stage, 288; examples of, 289
- Multituberculation, cc
- munda, Dumortieria, Pl. 44, figs. 10-12, p. 259 (Dum. subundulata var.); p. clxxxvi
- mundum, Haplopleuroceras, Pl. 51, figs. 11, 12, p. 302
- mundum, Toxolioceras, Suppl., Pl. 18, figs. 4-6, p. cxxvi
- Munier-Chalmas, 447, 452
- munieri, Dumortieria, Pl. 37, figs. 14, 15, p. 237 (Dum. costula); Suppl., Fig. 167, p. cxevi; p. clxxv
- Munieri, Dumortieria, 188, 237; Harpoceras, 237, clxxv
- Murchisonæ, Ammonites, 17, 47, 48, 53, 127, 227, xxxv, lxx, lxxii, lxxiii
- Murchisonæ bed, 2
- Murchisonæ, Harpoceras, 8, 17, 53
- Murchisonæ hemera, vi, xxxv; strata of, xxxv, ccvii
- Murchisonæ, Hildoceras, 17, xxxvi
- Murchisonæ, Ludwigia, Pl. 2, figs. 1, 2, 5; Pl. 3, figs. 1, 2; Pl. A, fig. 8, pp. 17, 124; Suppl., fig. 22, p. lxiv (Kiliania laciniosa); fig. 26, p. lxix; p. lxx
- Murchisonæ, Ludwigia, Pl. 1, see obtusiformis, Welschia; Pl. 2, figs. 3, 4, see pinax, Strophogyria; Pl. 3, fig. 3, see patula, Ludwigia; p. 17, see spp. above
- Murchisonæ, Ludwigia, 16, 18, 65, 108, 128, 227, li, lxxi, lxxxiii
- Murchisonæ, Ludwigia, in Opalinum zone, 102 = undatum, Cylicoceras
- Murchisonæ, Ludwigia, hemera, ccv
- Murchisonæ acutus, Ammonites, 22, lix
- Murchisonæ falcatus, Ammonites, lxxxiii
- Murchisonæ intra-lævis, Ammonites, lxii
- Murchisonæ obtusus, Ammonites, 17, liii, lxvi
- Murchisonæ planatus, Ammonites, 31
- Murchisonæ var. Baylii, Ludwigia, Pl. 3, figs. 6, 7, p. 18, see Baylii, Brasilina
- Murchisonæ, var. bradfordiense, Harpoceras, 22
- Murchisonæ var. obtusa, Ludwigia, Pl. 3, figs. 4, 5, p. 17, see tuberculata, Ludwigia
- Murchisonæ zone, 3, 4, 6, 7, 63, 221, 223, 282, 291, 292; found in Dorset, 8; spp., showing its presence in Dorset, list, 8; thickest at Corton Downs, 10; and Opalinum, intimate connection at Symonsbury Hill, 274
- Museum, of Geological Survey, 178; of Practical Geology, 255, 256, 376; see Bristol, British, Jermyn Street, etc.

- mutans**, *Dumortieria*, Pl. 40, figs. 3-8, p. 243
(*Dum. striatulo-costata*, var.); **Suppl.**, Fig. 170, p. cxcvi; p. clxxvii
- mutans**, *Sonninia*, Pl. 91, figs. 4-6, pp. 387, 414
- Mutation**, 100, 289
- Nailsworth, 107, xxi, xxxiii; strata of, ccix
- nannodes**, *Asthenoceras*, Pl. 33, figs. 13-16, p. 213
(*Grammoceras nannodes*); **Suppl.**, Pl. 11, fig. 28, p. xlix
- nannodes*, *Grammoceras*, Pl. 33, figs. 13-16, p. 213; see **nannodes**, *Asthenoceras*
- nannodes**, *Grammoceras*, xlix
- narbonensis**, *Lillia*, **Suppl.**, Pl. 2, figs. 3, 4, p. xiv
- narbonensis*, *Lillia*, ix
- Nautilus*, 48, cci; dead shells of, dispersal of, 454, 455; *clausus*, *comptus*, *costula*, *mæandrus*, *opalinus*, *radians*
- navis*, *Ammonites*, vii, ix, x, xxii
- Navis group**, xxii
- navis**, *Haugia*, **Suppl.**, Pl. 2, figs. 5-7, p. xxii
- navis*, *Trigonia*, bed, 2; zone of, 49; beds, 258
- Neanic**, 357
- Neumayr**, 13, 14, 225, 269, 287; on Classification of *Ammonites*, 11
- Neumayria**, 14
- New Duston**, 40, 55; reason for name, 52; see **Duston**, **Old Duston**
- Newton**, E. T., 178, 376, clxi; suture line of *Am. Moorei*, 178; on *A. Moorei*, 255, 256, 258
- Newton**, Surgeon-Major Isaac, clxi
- Nibley**, strata of, ccix; see **North Nibley**
- Nibley Knoll**, 86; section of, 46; correlation, 166
- Nicklès**, Prof. R., and tracing septa, 380
- Nilssoni**, *Phylloceras*, 301
- niortense**, *Stenoceras*, *hemera*, ccv
- niortensis**, *Ammonites*, 10, 270, 272, clxx; *Parkinsonia*, characters of, as compared to *Tmetoceras*, 270; *P.*, specialised development of *Park. garantiana*, 271; *hemera*, vi
- nitens**, *Paineia*, **Suppl.**, Fig. 33, p. lxxvii
- nitescens**, *Grammoceras*, cxxxi; *Harpoceras*, cxxxi
- nodata**, *Ludwigella*, **Suppl.**, Pl. 19, figs. 34-36, p. xc
- nodata**, *Sonninia*, Pl. 89, figs. 1-5; pp. 369, 387, 407
- Nodate stage** (*Ecotraustes*), cxcv
- Nodi**, 357
- Nodicostæ**, 357
- Nodicostate**, 357, 405
- nodifer**, *Ecotraustes*, Pl. 20, figs. 13, 14 (*Ec. conjungens*); **Suppl.**, Fig. 191, p. cxcvi; p. cxcv
- nodosus**, *Cirrus*, 7
- Nodules**, 44, 45, 47
- Nodular Bed**, 293
- Nodular shale**, date of, ccix
- Nodus**, 405, iii
- Nomenclature**, 315; rules of, 15; **British Association Committee on hybrid names**, 276; on generic names, 284
- Non-septicarina**, iv
- Non-septicarinata** (*gammiradiata*), cxxxi; (**series**), cxx, clvi, clvii
- Non-septituberculate**, iv
- Non-tuberculate group**, xxviii; (**series**), cxliii
- norma**, *Polymorphites*, 267, 268, 269, 284
- Normal variation**, 289
- Normandy**, 8, 9, 62, 120, clxx, clxxi, clxxii, clxxiv, cxcii; strata, 64; and *Sonninia*, 452; species of *Lioceras*, xliii; strata of, ccvi
- normannianum**, *Grammoceras*, 163, 189
- normannianus**, *Ammonites*, 132
- North Coker**, lxxxv
- North Cotteswolds**, 64
- North Dorset**, 61, 324
- North Nibley**, 40, 55, 87, 88, 151, 153, 158, 173, 181, 196, 199, 209, 213, 220, 231, xxiii, xxiv, xxvi, xxvii, xxviii, xxix, xxxi, xxxii, clviii, clix, clx; a species from, described, clxi
- North Germany**, 96
- North Oxfordshire**, 40
- North Sea**, 456
- North Stoke**, xxvi, clxxxv; strata of, ccvi, ccviii
- Northampton**, xl; district, section, 47
- Northampton Sand**, 48, 52
- Northampton Sands**, 168; section, 48; represent *Opalinum* zone, 168; for *Tmetoceras*, clxx; date of, ccvii
- Northamptonshire**, 40, 53, 55, xv, xviii, xl, clxx; remarks on strata of, xv; Liassic rocks, xl; strata of, ccvii, ccix
- Notgrove Freestone**, date of, ccvii
- Notgrove Station**, 9
- novata**, *Dumortieria*, **Suppl.**, Fig. 163, p. clxxiii

- nuda*, *Sonninia*, Pl. 82, figs. 3, 4; Pl. 103, fig. 10; pp. 352, 386, 402
**nudus*, *Amaltheus*, Pl. 49, fig. 3, p. 288
nudus, *Amaltheus*, 287
 Numerical acme, excix
- obesum*, *Pseudogrammoceras*, Suppl., Fig. 146, p. cl
 Osborne, 117, 120, 292, 304, 305, 306, 309, 310, 312; section at, 8; strata of, 10, ccvi; see Frogden Quarry
obruta, *Fontannesia*, Suppl., Pl. 24, figs. 8-11, p. clxxxix
 Obsoletecarinate, note on, xcv
obtecta, *Denckmannia*, Suppl., Pl. 4, figs. 4-6, p. xxi
obtecta, *Denckmannia*, x
obtusa, *Cosmogyrina*, Suppl., Pl. 4, figs. 10-12 d, p. liii
obtusiformis, *Sonninia*, Pl. 72, figs. 3-5; Pl. 90, fig. 10 (Pl. 85, figs. 7, 8?); Figs. in text, 27, p. 391; 53, p. 428; 79, p. 443; pp. 333, 430
obtusiformis, *Welschia*, Pl. 1, p. 17 (*Ludwigia Murchisonæ*); Suppl., Pl. 4, fig. 19; Pl. 12, figs. 1-3 a; p. li
obtusum, *Asteroceras*, morphological equivalent, 334
obtusum, *Ammonites*, 226
occidentale, *Hammatoceras*, 154; *Harpoceras*, 154
occidentalis, *Ammonites*, 144
occidentalis, *Haugia*, Pl. 27, figs. 1, 2, p. 154; Suppl., p. xxviii
occidentalis, *Haugia*, 165
occlusum, *Hyperlioceras*?, Suppl., Pl. 21, figs. 34-36
Ecotraustes, p. cxciv; *conjungens*, *costiger*, *nodifer*, *rugosus*
Ecotraustes, 140
Edania, Suppl., p. cvii; *delicata*, *falcigera*, *inflata*, *lepta*, *parvicostata*
Edania, classification, cxcviii
Ekotraustes, cxciv
 Ogerieni, *Ammonites*, 149, 152, vii, x, xi, xxiv, xxv; *Hammatoceras*, 148, 287, 313, x, xxiii; *Hammatoceras* (*Sonninia*), 149
ogerieni, *Haugia*, Suppl., p. xxiv
Ogerieni, *Haugia*, Pl. 23, figs. 16, 17, see *Dumortieri*, *Phymatoceras*
Ogerieni, *Haugia*, 46, 152, xxx
 Old age affecting carina, cvi
 Old Duston, 52; stonepit, section at, 48; Northampton Sand, 52; see Duston
 Oligogyral, ii
omphalica, *Sonninia*, Pl. 83, figs. 5-9; pp. 363, 387, 405
Omphalica stock, separation of species in, 362
 Ontogeny, Hyatt's scheme of stages, 357; terms of, 357; six stages of, 357; not repeating phylogeny, causes of, 290; and phylogeny, excix; events in, ccii
 Oolite, Great, 47
 Oolite, ironshot, date of, ccvi
 Oolite, from Lias, 5; see Inferior Oolite, Lias-Oolite division
 Oolite Marl, 7, 65; date of, ccvii
 Oolite Sands, 3
oolitica, *Rhynchonella*, 43
opaca, *Ludwigella*, Suppl., Pl. 19, figs. 19-21, p. xc
opalina, *Ludwigia*, 35
Opalini hemera, change of name, xlv
opaliniforme, *Cypholioceras*, Pl. 13, figs. 1-3; Pl. A, fig. 10, p. 35 (*Lioceras opalinum*); Suppl., Pl. 10, figs. 1-4, p. xlv; figs. 1, 3, p. xxxiv
aff. opaliniforme, *Cypholioceras*, Suppl., p. xlv
opaliniforme, *Cypholioceras*, hemera, ccv
Opaliniformis hemera, vi, xlvi; strata of, xxxv, ccviii
Opalinoid *Ammonites*, position of, clxxxiii; species, xxxv
opalinoides, *Ammonites*, 228, xxxiii; type chosen, 80, 228
Opalinum beds, 164, 166-168
opalinum, *Harpoceras*, 4, 13, 35, 53, 127, xxxvi, xlii, xlvi; *Leioceras*, 35
opalinum, *Lioceras*, Suppl., Pl. 10, figs. 6-8; fig. 2, p. xxxiv; p. xli
opalinum, *Lioceras*, Pl. 13, figs. 1-3, see *opaliniforme*, *Cypholioceras*; Pl. 13, figs. 4, 5, sp., *Canavarina*; Pl. 13, fig. 6, *striatum*, *Lioceras*; Pl. 13, figs. 7-10, *subglabra*, *Walkeria*; Pl. 13, fig. 12, *striatum*, *Lioceras*; p. 35, see spp. above

- opalinum, *Lioceras*, 12, 13, 21, 43-52, xxxv, xxxix, xli, xlii, xlv, cxxx, cxli, cxliii; selected as type of genus, 12; correction, xli; confounded with *Cypolloceras opaliniforme*, xlv
- Opalinum zone, 2, 4-7, 43, 45, 46, 51, 52, 53, 163, 166, 222, 223, 282, 291; localities where found, fossils of, 10; geology of, 41; occurrence in several countries, 53
- opalinum*, var. *comptum*, *Lioceras*, Pl. 13, fig. 11, see *partitum*, *Lioceras*; Pl. 14, figs. 1, 2, sp., *Lioceras*; Pl. 14, figs. 3, 4, *partitum*, L.; Pl. 14, figs. 5, 6, *plicatum*, *Cypholloceras*; p. 53, see spp. above
- Opalinum, var. *comptum*, *Harpoceras*, 54
- Opalinus, remarks concerning mistaken identification of, xli; Ammonites, 14, 35, 47-53, 127 255, xxxvi, xli, clxxxii; Am., Quenstedt's confusion about, xxxv
- opalinus, zone of, 49, 51
- Opalinus beds, necessity for correction concerning, xxxv; term rejected, xxxv
- opalinus, *Nautilus*, 35, xxxvi, xli
- opalinus *costosus*, Ammonites, 102, xxxvi, xxxviii
- Ophioceras, 13, 201, 232, 233
- Opis, 45
- Oppel, Dr. A., 2, 17, 49, 87, 117, 146, 155, 156, 170, 173, 189, 192, 205, 304, 306, vii, viii, xvii, xviii, xxix: on Jurassic Rocks, 2; his zones, 49; Am. *jurensis*, 51; mistake about carina, 156
- Oppelia, 14, 40, 140, 217, 295; not derived from *Arietites*, 130; discus
- Oppelidæ, exciv; radial lines, cxevi
- Opposite lateral lobules, 364
- Orbigny, A. d', 9, 17, 55, 60, 86, 117, 121, 124, 146, 148, 153, 169, 170, 184, 188, 192, 215, 217, 219, 241, 304, 305, 309, vii, viii, x, xxiii, xxvii, cxxxii, cxxxvii; on subdivision of Ammonites, 10; on Am. *primordialis*, 55; on Am. *concavus*, 60, 86; on Am. *cadomensis*, 120; on Am. *cycloides*, 124; and Am. *radians*, 187; and A. *discoides*, 217
- Orbignyi*, *Grammoceras*, Pl. 27, figs. 3-6, p. 184, see *orbignyi*, *Phlyseogrammoceras*
- Orbignyi, *Grammoceras*, 183, clv
- orbignyi*, *Phlyseogrammoceras*, Pl. 27, figs. 3-6, p. 184 (*Grammoceras Orbignyi*); Suppl., Fig. 135, p. clxvii; p. clv
- Ornament, importance of character of, i; manner of, not the kind important, ii; (test), excix; acme, cc; intersection of, cc; longitudinal, cc; transverse, cc; elaboration, acme of, cc; longitudinal examples of, cci; on periphery, cci
- Ornaments, 270
- Ornamentation, iv; as criterion of affinity, ii
- Ornate, iv, viii; see also *crassornate*, *inæquiornate*, *irregulari-ornate*, *lævigata*, *parviornate*, *regulari-ornate*
- Ornatilobate, v
- Ornatus beds, xl
- Orthoceras, cci, ccii
- Ostreae, 455
- Otley Hill, 40, 52; strata of, ccvii
- Outcoiling, clv
- ovalis, *Sonninia*, 315
- ovatum, *Grammoceras*, 163
- Overbury, clvi, clxi
- ovum, *Leda*, upper beds of, date of, xv
- Oxford, 53
- Oxford Clay, 131, 133, xl
- Oxfordshire, 52, ccvii
- Oxynoticeras, 45, 225, 226; *discoides*, *oxynotum*; from *Hudlestonia*, 225
- Oxynotoceras; *oxynotus*
- oxynotum*, *Oxynoticeras*, 227, 230
- oxynotus*, Ammonites, 226; *Oxynotoceras*, xl
- Oysters, 43
- pachu**, *Pseudogrammoceras*, Pl. 34, figs. 1, 2, p. 203 (*Grammoceras Sæmanni*); Fig. 147, p. clxvii, p. cli
- Pachygyral, iii, cxcvii
- pagana**, *Welschia*, Pl. 12, figs. 5-7, p. 25 (*Lioceras bradfordense* var. *giganteum*); Suppl. Pl. 11, fig. 32, p. lii
- Paine, Dr. T., and *Paineia*, lxxvi
- Paineia**, Suppl., p. lxxvi; **nitens**
- Paineia*, from *Lucya*, *Depaceras*, lxxiv; classification, cxviii
- Painswick, 94, 96, 100
- Palæontological horizons, confusion, xv; phenomena, xii
- Palæontology, 10; geological importance of correctness in, 342; confusion and difficulty caused by incorrect, 342; geology marred by "sufficiently near" identification, 342

- palmata**, *Sonninia*, Pl. 90, figs. 7-9; Figs. in text, 15, p. 388; 41, p. 411; 67, p. 443; pp. 372, 412
- Palmate**, 374; Professor Blake's use of, 374
- Paltopleuroceras**, *cci*; **spinatum**
- papilionacea**, *Sonninia*, Pl. 90, figs. 1-3; Figs. in text, 5, p. 384; 31, p. 394; 57, p. 443; p. 367
- Papilioniform superior lateral lobe**, 368
- Papilla**, iii
- Paquier**, V., and **Paquieria**, lxvi
- Paquieria**, Suppl., p. lxvi; **angulata**, **floccosa**
- Paquieria**, classification, cxcviii
- Paracme**, 357
- Parallela**, cxliii
- Parvicarinate**, xcv; (series), xcv
- Paris Basin**, 249
- Parkinsoni beds**, ccix
- Parkinsoni**, *Cosmoceras*, 10
- Parkinsoni zone**, 4, 6-8, 46, 51, 165; places where found, thickness of, 10; at Halfway House, fossiliferous, 10
- Parkinsonia**, 269, 272; *Caumonti*, *difalensis*, *dorsetensis*, *garantiana*, *niortensis*, *sutneri*, *veneris*
- Parkinsonia**, specialised development of *Stephanoceras*, 271; ontogeny of, 271; derived from a *pettos*-*Blagdeni* radical, 271; periodic constrictions of, 272
- Parkinsonian Age**, ccv
- particostata**, *Cotteswoldia*, Suppl., Pl. 23, figs. 5-7; p. cxxxiii
- Partition band**, 81, xvi
- partitum**, *Lioceras*, Pl. 13, fig. 11; Pl. 14, figs. 3, 4, p. 55 (*L. opalinum* var. *comptum*); Suppl., Pl. 9, figs. 4-6; p. xxxix
- Parvicarina**, iv
- Parvicarinate**, cvi; (series), cvi
- parvicostata**, *Ædania*, Suppl., Pl. 21, figs. 7-9 a; p. cviii
- parvicostata**, *Sonninia*, Pl. 74, figs. 2, 3; Pl. 75, figs. 3-5; Figs. in text., 7, p. 385; 33, p. 395; 59, p. 443; pp. 339, 396
- Parvicostate**, iii
- Parvilobate** (series), lxiv
- Parviornate**, viii
- parvispinata**, *Zurcheria*, Pl. 49, figs. 18-20; Pl. 50, figs. 1-3; p. 296
- parvispinata**, *Zurcheria*, 381
- Parvituberculate stage**, clxix
- parvula**, *Rhynchonella*, 5
- patella**, *Hammatoceras*, 13
- patellaria**, *Apedogyria*, Suppl., Pl. 14, figs. 3-5; fig. 16, p. lix
- patelliformis**, *Haugia*, Suppl., Pl. 3, figs. 1-3, p. xxv
- patelliformis**, *Haugia*, x
- Pathological cases**, 289
- patula**, *Ludwigina*, Pl. 3, fig. 3, p. 17 (*Ludwigia Murchisonæ*); Suppl., Pl. 14, figs. 7, 8; Fig. 17 in text; p. lxi
- paucicostata**, *Cotteswoldia*, Suppl., Pl. 23, figs. 1-3; p. cxxxiii
- Paucicostate**, iii; (series of *Dumortieria*), clxxii; stage, absence of, clxxii; to costate (series of *Dumortieria*), clxxvi
- Paucicostatæ**, xciv
- paucinodata**, *Sonninia*, Pl. 91, figs. 7-9; pp. 370, 387, 408
- paucinodata stock**, 368
- pauciseptata**, *Dumortieria*, Suppl., Fig. 165, p. clxxv
- Pauciseptate**, v
- pauper**, *Phymatoceras*, Suppl., Pl. 3, figs. 7-9; p. xxxi
- pauper**, *Phymatoceras*, xi
- Paucituberculate**, ix
- Paving Bed**, 19, 62, 214; date of, ccvii; of *Bradford Abbas*, for *Tmetoceras*, clxx
- Pea grit**, 3, 7; date of, ccvii; of *Brockhampton*, lxvi; series, 43, 65, xxxv
- Peak**, 173, 188
- pedicum**, *Pseudogrammoceras*, Suppl., Fig. 140, p. cxlvii
- Pedigerous**, 405
- Pelagic forms**, 454
- Pelecoceras**, 13, 119, 180, 225; *attenuatum*, *affine*, *Fridericii*, *serrodens*, *sinon*; from *Hudlestonia*, 225; *Hyatt's* remarks on, 225, 226
- penestriatulum**, *Grammoceras* Pl. 28, figs. 16, 17, p. 173 (*Grammoceras striatulum*); Suppl., p. cxxxii
- Penetabulate**, cvi
- penexigna**, *Dumortieria*, Pl. 42, figs. 3-5; p. clxxxi

- Penn Wood, 153, 229, 231, 239, 251, 252, 253, 275, 281, xlii, clxix, clxxi, clxxii, clxxiii, clxxvii, clxxviii, clxxix, clxxv, clxxxvi, clxxxvii
- Penn Wood, strata of, ccviii
- Pentacrinites, 43
- Per-, use of, cxcvii
- Perangustumbilicate, cxcvii
- peregrinus, Polymorphites, 234
- Periodic constrictions, 263
- Peripheral projection, loss of, lxxii
- Periphery, nomenclature for, iv; fastigation of, in relation to development, lxvii; carinatitabulate, cv; degrees of tabulation of, cvi; carinatitabulate, polyphyletic, cxv; ornament on, cc; subtabulate (division), lxvi; tabulate (division), lxv; angulate, cci; carinate, cci; carinatisulcate, cci; tuberculate, how produced, cci
- Perisphinctes, 14, 256, 272; Davidsoni, Martinsii, procerus; and Parkinsonia, 272; polygenetic origin of, 272; descended from coronate radical, 272; as senile development of Stephanoceras, 272
- Perlatumbilicate, cxcvii
- Perleptogyral, cxcvii
- perovalis, Terebratula, 8
- Perpachygyral, cxcvii
- Perplatygyral, cxcvii
- Perroudi, Ammonites, clxxii; Catulloceras, 277, 281, 282, 285
- Perstenogyral, cxcvii
- pertinax, Hammatoceras, 294, 297
- pertinax, Zurcheria, Pl. 49, figs. 21, 22; p. 297**
- pettos-Blagdeni, Ammonites, 271, 272
- Phenomena of development, cxci
- Phillips, Professor J., 241, clxxiv
- Phillipsiana beds, ccix; date of, ccvi
- Physeogrammoceras, p. cliv; dispansum, metalarium, orbignyi**
- Physeogrammoceras, classification, cxviii
- Photography, example of incorrectness of, 320; applied to suture lines, 380; errors of, 380
- Phylembryonic, 357
- Phylephebic, 357
- Phyllhypostrophic, 357
- Phylloceras, 119; cycloides, heterophyllum, nilsoni, subcarinatum, trifoliatum, ultramontanum
- Phylo-, as prefix, 357
- Phylobrephic, 357
- Phylocatabatic, 357
- Phylocatagenesis, cci, ccii
- Phylogenetic series, 295
- Phylogeny, ccii; not repeated in ontogeny, causes of, 289; terms of, 357; stages of, how distinguished by terms, 357; and ontogeny, cxci
- Phylogerontic, 357; stage, lxiv
- Phyloneanic, 357
- Physeogrammoceras, cliv (misprint), see Physeogrammoceras
- Phymatoceras, p. 106; Suppl., pp. xi, xxx; dumortieri, pauper, robustum, tirolense**
- Phymatoceras, 13; from Brodieia, xxxi; from Physeogrammoceras, clv; classification, cxviii
- Phymatoidæ, 13, 15
- pigrum, Cypholloceras, Suppl., Pl. 5, figs. 3, 4; p. xlv**
- Pilæ, Hyatt on, 233
- pinax, Strophogyria, Pl. 2, figs. 3, 4 (Ludwigia Murchisonæ); Suppl., Fig. 21, p. lxiii**
- Pinguia, cxiii, cxlix
- pinguis, Brasilia, Pl. 12, figs. 1-3, p. 66 (Lioceras concavum var. pingue); Suppl., Fig. 42 in text, p. lxxxi**
- piodes, Reynesella, Pl. 16, figs. 7-9, p. 92 (Hyperlioceras Walkeri); Suppl., Pl. 18, figs. 24, 25; p. cix**
- Pipley Bottom, xxvi
- Pisolite beds, 3
- Pisolite character absent, lxvi
- Pisolitic beds, conditions, 3
- pisolithica, Terebratula, 43
- placidum, Pseudogrammoceras?, Pl. 29, figs. 8-10; Pl. 33, figs. 11, 12; p. 182 (Grammoceras dœrntense); Suppl., Fig. 152, p. clxvii; p. cliii**
- planaris, Darellina, Suppl., Pl. 17, figs. 22-24; Pl. 22, figs. 7-9; p. cvi**
- Planate, iv
- planicosta, Ammonites, 232, 289
- Planicostan abdomen, 233, 264
- plani-fastigate, iv; (series), lxxxi
- Plant bed, 47
- Planulati, Lias, not ancestors of Perisphinctes, 272

- platychora**, *Apedogyria*, Pl. 5; Pl. 4, fig. 8, p. 22 (*Lioceras bradfordense*); Suppl., Pl. 11, fig. 33; p. lx
- Platygraphoceras**, Suppl., p. xciii; *apertum*, *carbatinum*, *compactum*, *latum*, sp.
- Platygraphoceras**, from *Graphoceras*, xcv; classification, cxviii
- Platygyral**, iii, cxvii
- platystomum**, *Stephanoceras*, 312
- plectile**, *Lioceras*, Suppl., Pl. 9, figs. 10-12, p. xxxix
- Pleuroceras**, 286, 287, 288, 295, 300, 301, 314; *hawskerense*, *pseudocostatum*, **spinatum*, *subspinatum*, *vittatum*; allied to *Sonninia*, 110; prior use of name for a genus of *Gastropoda*, Haug's note, 288; and *Amaltheus*, separation of characters of, 288; spp. of, compared to *Zurcheria*, 295; from *Sonninia*, 314
- Pleydellia**, Suppl., p. cxxxvii; *aalensis*, *fluens*, *comata*, *leura*, *mactra*, sp., *subcompta*
- Pleydellia**, from *Walkeria*, cxxxix; classification, cxviii
- plicata**, *Sonninia*, Pl. 97, figs. 6-8; Figs. in text, 18, p. 388; 44, p. 415; 70, p. 443; p. 415
- plicata**, *Terebratula*, 7, 43
- plicatellum**, *Lioceras*, Suppl., Pl. 8, figs. 10-12; Pl. 9, figs. 7-9; p. xxxviii
- plicatum**, *Cypholioceras*, Suppl., Pl. 8, figs. 7-9, p. xlv; and ? Pl. 14, figs. 5, 6, p. 54 (*Lioceras opalinum* var. *comptum*); p. cxxx
- Plottii**, *Clypeus*, 7
- Podagrosi**, 109, x
- Pœcilomorphus**, p. 115; Suppl., p. cxci; *cy-cloides*, *macer*, *mercati*
- Pœcilomorphus**, classification, cxviii
- Pœcilomorphy**, acme of, cxix
- polita**, *Darellia* ?, Pl. 16, figs. 3-6, p. 92 (*Hyperlioceras Walkeri*); Suppl., Pl. 18, fig. 31; p. cxiv
- polyacanthum**, *Hammatoceras* (*Sonninia*), 453
- polyacanthus**, *Ammonites*, remarks upon, proportions of, 376; *Sonninia*, 375, 376
- Polygenetic**, specimens, 257; forms, how distinguished, cxviii
- Polygyral**, ii
- Polymorphidæ**, 231, 266, 267, 269; revision, clxix; résumé of, 281; genealogy of (Table V), 282, 293; radial lines, cxvi; classification, cxviii
- Polymorphism**, 243
- Polymorphites**, p. 267; *Bronni*, *confusus*, *norma*, *peregrinus*, *polymorphus*, p. *costatus*, p. *lineatus*, *senescens*, *vernosa*, *zitteli*
- Polymorphites**, from allies, 267; classification, cxviii
- polymorphus**, *Polymorphites*, 161, 232, 234, 266, 267, 283, 284, 289
- polymorphus costatus**, *Polymorphites*, 267, 283
- polymorphus lineatus**, *Ammonites*, 289; *Polymorphites*, 232, 267, 283
- Polyphyletic origin of similar peripheries**, cxv
- Polyplectus**, p. 214; Suppl., p. clvii; *discooides*
- Polyplectus**, classification, cxviii
- Polyzoa**, 43
- Port-en-Bessin**, strata of, ccvi
- Portree**, lxx
- Posidonomya** *Bronni*, zone of, 50
- Post-nodate stage** (*Ecotraustes*), cxv
- ***præstabilis**, *Amaltheus*, Pl. 49, fig. 3; *nudus*, *Amaltheus*
- præstabilis**, *Amaltheus*, 287
- Prefiguration**, morphological, 315; morphic, cciii
- Primary ribs**, 16
- primordialis**, *Ammonites*, 35, 55
- prisca**, *Dumortieria*, Pl. 37, figs. 9-11, p. 236; p. clxxii
- prisca**, *Dumortieria*, clxxiii
- Prisca style of ribbing**, clxxiv
- procera**, *Chemnitzia*, 164
- procerus**, *Perisphinctes*, 272
- Progression**, in development, 289; of ventral area, 299
- Progressive decline**, of rostration, lxxx; of costation, umbilicus, compression, lxxxix
- projecta**, *Braunsina*, Suppl., Pl. 20, figs. 7-9; p. c
- propinquans**, *Ammonites*, 143; *Sonninia*, 450
- Proportional triangles**, cxvii
- Prorsicostate** (series, *Fontannesia*), cxci
- Prorsiradiata**, iii
- Prorsiradius**, iii
- Prorsum**, iii
- Prosiphonata**, 126
- proximum**, *Harpoceras*, 158
- Prussia**, *Grammoceras* in, 169
- psamminum**, *Catullocceras*, Pl. xli, figs. 7, 8, p. 248 (*Dumortieria radians*); Suppl., p. clxxi
- pseudocostatum**, *Pleuroceras*, 287, 291, 295

Pseudogrammoceras, p. cxliii; **Bingmanni**, *cotteswoldiæ*, *dœrntense*, *expeditum*, *explicatum*, *fallaciosum*, *muelleri*, *obesum*, *pachu*, *pedicum*, *placidum*, *quadratum*, *aff. quadratum*, *regale*, *sæmanni*, sp., *struckmanni*, *subfallaciosum*, *subquadratum*, *thrasu*

Pseudogrammoceras, dates of existence of species of, cliv; from *Phlyseogrammoceras*, clv; classification, cxviii

Pseudographoceras, *Suppl.*, p. xci; *cariniferum*, *compressum*, *deletum*, *limatum*, *litteratum*, *sp.

Pseudographoceras, from *Platygraphoceras*, xciii; from *Graphoceras*, xcv; from *Braunsina*, xcix; from *Braunsella*, cii; from *Reynesia*, ciii; from *Graphoceras*, xcv; classification, cxviii

Pseudolioceras, p. 81; *Suppl.*, p. clviii; *beyrichi*, *compactile*, *dumortieri*, *falcidiscus*, *gradatum*, **lythense*, *pumilum*, *replicatum*

Pseudolioceras, 60, 129, 223; from *Haugia*, 143, 144; from *Pseudogrammoceras*, cxliv; classification, cxviii

pseudoradiosa, *Dumortieria*, Pl. 41, figs. 1-3, 9, 10, p. 246

pseudoradiosum, *Harpoceras*, 246, 253, 259

Psiloceras, 170, clxxxvi

ptycta, *Sonninia*, Pl. 73, fig. 1; Pl. 96, fig. 7; *Figs. in text*, 21, p. 389; 47, p. 418; 73, p. 443; pp. 332, 390, 420

Puckham Farm, lxvi

pugnax, *Hammatoceras*, 294, 298

pugnax, *Zurcheria*, p. 298; *Suppl.*, Fig. 188, p. cxcii

pugnax, *Zurcheria*, 291, 295, 296, 299, 300

pulchra, *Brasilia*?, Pl. 10, figs. 3, 4, p. 72 (*Lioceras concavum* var.); *Suppl.*, Fig. 41 in text, p. lxxxi

pulchra, *Dorsetensia*, Pl. 52, figs. 25-27, p. 306

pumilum, *Pseudolioceras*, Pl. 20, figs. 5, 6, p. 85 (*P. compactile*); *Suppl.*, p. clix

punctum, *Stephanoceras*, 301

pustulifer, *Ammonites*, 258, 453

pustulifera, *Hyattia*, *Suppl.*, Pl. 13, figs. 1-3, p. lv

pustulifera, *Sonninia*, 258

pygmæum, *Lytoceras*, 301

quadratum, *Grammoceras*, Pl. 34, figs. 6, 7, p. 201;

see **aff. quadratum**, *Pseudogrammoceras*

quadratum, *Grammoceras*, 221, 222, cxliv

quadratum, *Hildoceras*, 201, cxliv

quadratum, *Pseudogrammoceras*, cxliv

aff. quadratum, *Pseudogrammoceras*, Pl. 34, figs. 6, 7, p. 201 (*Grammoceras quadratum*); *Suppl.*, p. cxliv

quadratus, *Ammonites*, cxliv; (*Hildoceras*), 202

quadrifida, *Sonninia*, Pl. 91, figs. 1-3; pp. 366, 384, 394

quadrifida stock, 364

Quarrymen's terms, 48

Quenstedt, Professor F. A. von, 3, 17, 18, 22, 23, 31, 35, 36, 83, 85, 98, 102, 143, 149, 155, 156, 170, 174, 184, 188, 189, 190, 192, 195, 196, 197, 198, 200, 203, 205, 215, 229, 230, 237, 238, 239, 240, 241, 243, 244, 246, 248, 252, 255, 259, 293, 309, 310, 315, vii, viii, xxviii, xxxiv, xxxv, xxxvi, xl, xli, liii, lv, lix, lx, cxxxii, cxxxiv, cxlvii, clii, clx, clxxiii, clxxiv, clxxv, clxxxiii; opinion on *Lias-Oolite* division, 3; on *A. Murchisonæ*, 16; on *Am. Murchisonæ acutus*, 24; and *A. discoideus*, 99; on *Am. radians*, 156; confusion about *opalinus*, xxxv; and *A. Murchisonæ obtusus*, lxx

Radial curve, ii, cxci; hypostrophic character of, lxxii; features of, cci

Radial line, ii; caduceiform, lxxiv; like Greek bow, lxxix; subfalcate, lxxix; very angulate (series), ci; and rostration, cvi

Radial lines figured, xxxiv; evolution of various forms of, lxxiv; figures showing development of, lxxviii, lxxx; tables of, clxiii, clxv, clxvii, cxevi

radians, *Ammonites*, 50, 127, 143, 169, 184, 189, 190, 204, 205, 248, 252, cxlvii, clxxi, clxxviii, clxxx, clxxxi, clxxxiii, clxxxiv; synopsis of species to which the trivial name *radians* has been given, 188-190

radians, *Dumortieria*, Pl. 42, figs. 8-10, p. 247; Fig. 2, p. 187 (*Nautilus radians*); *Suppl.*, Pl. 22, figs. 31-33; Fig. 175, p. cxevi; p. clxxxix

radians, *Dumortieria*, Pl. 40, figs. 4-6, see **regularis**, D.; Pl. 40, figs. 7, 8, **psamminum**, *Catulloceras*; Pl. 42, figs. 1, 2, sp. D.; Pl. 42, figs. 3-5, **penexigua**, D.; Pl. 42, figs. 6, 7, **signata**, D.; Pl. 42, figs. 11, 12, **metita**, D.; Pl. 43, figs. 1-4, sp., D.; p. 247, see spp. above

- **radians*, *Grammoceras*, fig. 3, p. 187; see sp. **Dumortieria**.
radians, *Grammoceras*, 12, 45, 46, 143
radians, *Harpoceras*, 170, 189, 204, 205, cxlvii, cxlviii, clii
 radians*, *Nautilus*, fig. 2, p. 187; see *radians*, **Dumortieria
radians, *Nautilus*, 186, 188, 248
radians amalthei, *Ammonites*, 189
radians compressus, *Ammonites*, 143, 155, 188, 189, 190, vji
radians costula, *Ammonites*, 188, 237, 238
radians depressus, *Ammonites*, 170, 174, 188, 190, 205, 248, cxxxii, cxlvii
radians gigas, *Ammonites*, 190, 205, vii
radians numismalis, *Ammonites*, 189
radians quadratus, *Ammonites*, 190, 201, 203
radians, var. *exigua*, *Dumortieria*, Pl. 43, figs. 11, 12, see *exigna*, D.; Pl. 44, figs. 1-3, lata, D.; p. 252, see spp. above
radians, var. *exigua*, *Dumortieria*, clxxxiii
Radiate, see *radius*; also *anguli*-, *biarci*-, *falci*-, *flexi*-, *gammi*-, *prorsi*-, *recti*-, *rursi*-, *subfalci*-, *torti*-, *versi*-, *v-scripti*-*radiate*
Radicals, of *Ammonite* branches, 270
Radii, how used, 57; sigmoidal, transitional, straight, 112; annular, subannular, 267
radiosa, *Dumortieria*, Pl. 30, fig. 18, see *subfasciata*, D.; Pl. 42, fig. 13-15; Pl. 43, figs. 5-7, see *diphyes*, D.; p. 253, see spp. above
radiosa, *Dumortieria*, clxxx, clxxxi; *Mascke* on, clxxx
radiosa, var. *gundershofensis*, *Dumortieria*, Pl. 45, figs. 13, 14, see *inclusa*, D.; p. 254, see *inclusa*, D., *subfasciata*, D.
radiosa var. *gundershofensis*, *Dumortieria*, clxxx, clxxxi
radiosus, *Ammonites*, 248, 253, clxxviii, clxxix, clxxx; *Mascke* on, clxxx
radiosum, *Harpoceras*, 253
Radius, 57, iii; see also *anguliradius*, *costa*, *costistria*, *flexiradius*, *prorsiradius*, *rectiradius*, *rursiradius*, *stria*, *strii*-*costa*, *versi*-*radius*
Ragstones, Middle, Lower, Upper, ccix
Ramesveram, 454
Ramsay, Sir A. C., on *Wotton-under-Edge*, 49
Ramsayi, *Trigonia*, 44
Recession of inner margin, 36
reclinans, *Sonninia*, Pl. 49, figs. 16, 17; Pl. 65, figs. 3, 4 (*S. crassispinata*); Pl. 98, fig. 7; Pl. 103, fig. 21; pp. 390, 421
Reclined ribs, 280
recticostata, *Darellella*, *Suppl.*, Pl. 17, figs. 10-12, p. cvii
Rectiradiate (*Pseudogrammoceras*), clii; (series of *Dumortieria*), clxxii
Rectiradius, iii
Recurved bifurcate ribbing, 124
Red Beds, date of, ccvi
Reduced figures, need for care in comparison with those of natural size, 333
refua, *Crickia*, *Suppl.*, Pl. 11, figs. 16-18; *Fig. in text*, 29, p. lxxiii
reformata, *Sonninia*, Pl. 89, figs. 6-8; pp. 391, 434
regale, *Pseudogrammoceras*, *Suppl.*, *Fig. 134*, p. clxvii; *Fig. 138*, p. cxlvi; p. cxlv
Regleyi, *Ammonites*, 273, 283; *Cosmoceras*, 273
Regleyi, *Tmetoceras*, Pl. 48, figs. 8-10, p. 273 (*T. scissum*); *Suppl.*, p. clxxi
Regulari-ornate, iv, viii
regularis, *Dumortieria*, Pl. 41, figs. 4-6, p. 248 (*Dum. radians*); *Suppl.*, *Fig. 174*, p. cx cvi; p. clxxviii
regularis, *Sonninia*, Pl. 64, figs. 1-3 (*S. marginata*); Pl. 96, figs. 3-5; pp. 385, 395
Reinecke, 35, 53, 186, 188, 196, 237, 238, 248, 249, 250, xxxiv, xxxvi, xl, xli, xliii, cxlviii, clxxv; collection, 187; specimens, xl
renovata, *Sonninia*, Pl. 93, figs. 1-6; *Figs. in text*, 28, p. 391; 54, p. 430; 80, p. 443; p. 433
renovata, *Sonninia*, cc
Renovate, series, 453; *Sonniniæ*, 448; species, xxxvi, xli; stage, species, xlii
renovatum, *Cypholloceras*, Pl. 14, figs. 7-9, p. 53 (*Lioceras*, sp.); *Suppl.*, Pl. 10, fig. 5; p. xlvi
replicatum, *Pseudolloceras*, Pl. 20, figs. 9, 10, p. 87 (*P. Beyrichi*); *Suppl.*, *Fig. 161*, p. clxvii; p. clx
Representation, morphic, cciii
Résumé of genera, 122-125

- Retrogression, 308; in development, 289; characters of, 289; the reversal of progression, 290; law of, latest acquired characters lost first, 294; in Zurcheria, 299; illustrated in crassa stock, 348; law of, relating to compression of whorls, 348
- Retrosiphonata, 126
- Reversion, 139; in development, 159
- revirescens, Sonninia, Pl. 70, fig. 1; Pl. 100, fig. 9; Figs. in text, 19, p. 389; 45, p. 416; 71, p. 443; pp. 324, 417
- Reynès, P., vii, viii, ix, cxvii
- Reynesella, Suppl., p. cix; inops, juncta, lineata, piodes, rodburgensis
- Reynesella, from Hugia, cxi; classification, cxviii
- Reynesia, Suppl., p. ciii; amœna, benigna, cœla, furcillata, intermedia, laxa, lepida
- Reynesia, classification, cxviii
- Rhæboceras, Suppl., p. lxxii; tolutarium, tortum
- Rhæboceras, from Crickia, lxxiii; classification, cxviii
- rheumatisans, Ammonites, 109, vii, x
- rhodanica, Dumortieria, Suppl., p. clxxix
- rhodanica, Dumortieria, 248
- Rhone basin, xiii; Grammoceras in, 168
- Rhynchonella, 47, 165
- Rhynchonellæ, 52
- Rhynchonella ringens beds, date of, ccvii
- Ribs, primary, 16; secondary, 16; and striæ=radii, 57; v-shaped, 57, 69, 73; changes of, 134; arcuate, 142, 158; subarcuate, 158; direct, 231; subdirect, 231; reclined, 280; falciform, 73, 294; scythe-shaped, 294; sickle-shaped, 294; undulate, 307; duplicated, homologous to spines, 345
- Ribbing, types of, 124
- Richardson, L., lxvi, cxlix, clxx, clxxix cxi
- ringens, Rhynchonella, 8, 9; beds, date of, ccvii
- Roadstone, ccix; date of, ccvi
- Robin Hood's Bay, 175
- Robinswood Hill, clxx
- robustum, Graphoceras, Suppl., Pl. 15, figs. 9-11, p. xc
- robustum, Phymatoceras, xxx
- robustus, Ammonites, vii, x
- Rodborough Hill, 90, 94, 96, 100, cx
- rodburgensis, Reynesella?, Suppl., Pl. 17, figs. 1-3, p. cx
- Roman province, xiv
- Romani, Ammonites, 305, 306; Dorsetensia, 307, 310
- Rostration, excix; increase of, influence on shape of radial line, cvi; progressive decline of, lxxx; degree of, cci
- Rostrum, projection of, cci
- rotabilis, Braunsella?, Suppl., Pl. 17, figs. 7-9; p. cii
- Rubbly Oolite, 3
- rubescens, Lytoceras, 165
- rudidiscites, Hyperlioceras, Pl. 18, fig. 1; Pl. 17, figs. 3, 4; p. 94 (H. discites); Suppl., Fig. 94, p. clxv; p. cxxiv
- rudidiscites, Hyperlioceras, ccii
- rudis, Ludwigella, Pl. 15, figs. 11-13; Pl. A, fig. 7, p. 103 (Ludwigia rudis); Suppl., Fig. 47 in text, p. lxxxv
- rudis, Ludwigia, Pl. 15, figs. 11-13, see rudis, Ludwigella; Pl. 15, figs. 14, 15, subrudis, L.; Pl. 15, figs. 16, 17, angulifera, Braunsina; p. 103, see spp. above
- rudis, Ludwigia, lxxxv, ci
- rugosa, Ludwigella, Suppl., Pl. 20, figs. 34-36; p. xc
- rugosus, Ecotraustes, Pl. 21, figs. 1, 2; Suppl., Fig. 189, p. cxvii; p. cxv
- Rursicostate (series Fontannesia), clxxxix
- Rursiradiata, iii; group, xxiii
- Rursiradius, iii
- Rursi-subflexiradiata, x
- Rursum, iii
- rustica, Welschia, Suppl., Pl. 4, figs. 16-18; p. lii
- rustica, Dumortieria, Pl. 45, figs. 4, 5, 10-12; p. 259 (D. subundulata); p. clxxxvi
- Rutland, 91
- Saddle, siphonal, 217
- Saddles and lobes, 219
- Sæmanni, Ammonites, 203, cxlix, cli
- Sæmanni, Grammoceras, Pl. 34, figs. 1, 2, see pachu, Pseudogrammoceras; Pl. 36, figs. 6-8, see thrasu, Pseudogrammoceras; p. 203, see spp. above
- Sæmanni, Grammoceras, cxlv, cli
- Sæmanni, Hildoceras, 203
- sæmanni, Pseudogrammoceras, Suppl., Fig. 145; p. cxlix

- St. Quentin, xvii
 Sand beds, date of, ccviii
 Sand Rock, 251
 Sandford Lane, 65, 374, lxxxvi, lxxxvii, lxxxviii, xciv, xcvi; strata of, ccvi, ccvii
 Sands, 173; section of [Yeovil], 5; thickness at different places, 6; of Inferior Oolite, 50; at Sodbury, 166; varying date of, comparative table, 167; Cotteswold, xii; yellow, xxxv; and Tmetoceras, clxx; and opalinoid Ammonites, clxxxii; dates of various, ccviii; see Blue, Bridport, Cotteswold, Grey, Harford, Midford, Yellow, Yeovil Sands
 Sandy ferruginous beds, 30, 42, 49; for Tmetoceras, clxx; date of, ccvii
 Sandy ferruginous Limestone, 44, 168, xxxv
 Sandy ferruginous Oolite, 275
 sauzei, Ammonites, 63, 454; Emileia, hemera, ccv; hemera, vi; hemera, strata of, ccvii
 Sauzei-Kalke, 453
 Sauzei-zone, 4, 8, 63, 292, 316; thickness of, 10; reasons for term, 292
 Sauzei-Sowerbyi zone, 316
 Sayni, Witchellia, 375
 scalpta, Sonninia, Pl. 87, figs. 1-3; pp. 376, 385
 Scaphitoid appearance, 403
 sceleta, Canavarella?, Suppl., Pl. 22, figs. 19-21; p. cxxix
 Schlotheimia, 267; Ungulata
 Schloenbach, 87, 88, 228, 229
 Schloenbachia, cci
 Schmidt, 227
 Schuchert, C., Brachiopoda, cxcix
 Schwarzer Jura, 3
 Scissi hemera, vi; strata of, xxxv, ccvii
 scissum, Simoceras, 273
 scissum, Tmetoceras, Pl. 48, figs. 4-7, p. 273; Suppl., p. clxx
 scissum, Tmetoceras, Pl. 48, figs. 1, 2, see circulare, T.; Pl. 48, figs. 8-10, Regleyi, T.; p. 273, see spp. above
 scissum, Tmetoceras, xxxv, clxxi; hemera, ccv
 scissus, Ammonites, 273; Haug on, 274
 Scotland, 19
 Scroff, date of, ccvi
 sculpta, Haugia, Pl. 26, figs. 1, 2, p. 156 (Haugia eseri); Suppl., p. xxix
 Scythe-shaped ribs, 294
 Secondary ribs, 16
 Sections, at Babylon Hill, 5; Bradford Abbas, 5; Stroud Hill, 7; Osborne, 8; Wyke Quarry, 8; Haresfield Hill, 43; Frocester Hill (Coaley Peak), 44; Coaley Wood, 45; Nibley Knoll, 46; Stinchcombe, 47; Burton Bradstock, 47; Northampton District (Sharpe), 47; Old Duston Stonepit (Sharpe), 48; Cotteswolds, analysis of, 49; Buckholt Wood, 164; Little Sodbury, 164; Lyncombe Cutting (Bath), 165; Midford Sands, 165; White Lackington, 165; correlation of (Table), 166; Dundry, 292, 293; correction of, 316; see also Geological details
 Seebach, 173, 211, 228, 246, 253, clxxviii, clxxix
 semicostata, Darellia, Pl. 12, figs. 10, 11, p. 34 (Lioceras decipiens var. intermedium?); Suppl., Pl. 18, fig. 30; Fig. 73, p. clxv; p. cxiii
 semilenis, Braunsella, Suppl., Pl. 17, figs. 19-21; p. cii
 semipolatum, Hildoceras, Pl. 22, figs. 30, 31; Pl. A, fig. 28; p. 112 (Hildoceras bifrons var.); Suppl., p. clvi
 semispinata, Sonninia, Pl. 77, figs. 1, 2; Pl. 103, fig. 15; pp. 343, 389, 416
 senescens, Polymorphites, Pl. 48 figs. 13-15; p. 268
 Senility, atavic, 357
 Septa, how to develop and trace, 380; abnormalities, 381; differences between, 382; terms for, v; see also densiseptate, inornatilobate, ornatilobate, pauciseptate
 Septal morphanagenesis, ccii
 Septicarina, iv; and degeneration, clvii; (series of Pseudogrammoceras without) cliii
 Septicarinata, clvi; (series), cxix; (gammiradiata), cxliii
 Septituberculate, iv
 Septum, in carina, clv
 Sequence of phenomena, cxcix
 Series, ascending, 200, 207
 serpentinum, Grammoceras, 158
 serpentinus, Ammonites, 13, 50, 112
 Serpulæ, 455
 serrodens, Ammonites, 119, 229, 230
 serrodens, Hudlestonia, Pl. 38, figs. 9-12; p. 229
 serrodens, Pelecoceras, 165

- Sessile, 405
 Sevenhampton, lxvi
 Seven Sisters, strata of, ccvii
 Sharpe, S., 48, 52; on Northampton Oolite, 47; on Am. Murchisonæ, 53
 Shepton Beauchamp, xiv, xix, xx, xxi, xxiv, xxv, xxvi, xxvii, cli
 Shepton Mallet, cxlvi
 Sherborne, 19, 28, 31, 32, 40, 61, 65, 90, 97, 106, 108, 120, 121, 275, 292, 305, 307, 309, l, liv, lviii, lix, lxi, lxxi, lxxvii, lxxi, lxxii, lxxiii, lxxxv, lxxxvi, lxxxvii, lxxxviii, xciv, xcvi, exc; Ammonites of disused quarry at, 292; excavations at, and Mr. Hudleston, 374; strata of, ccvi, ccvii
 Shire, note on, 359
 Sick-shaped ribs, 294
 sigalœn, *Lytoceras*, cc
 Sigmoidal ribbing, 124
 Signalberg, 258
signata, *Dumortieria*, Pl. 42, figs. 6, 7, p. 248 (*Dum. radians*); Suppl., fig. 176, p. cxevi; p. clxxix
similis, *Brasilia*, Pl. 15, figs. 1, 2; Pl. A, fig. 13; p. 31 (*Lioceras decipiens* var. *simile*); Suppl., Pl. 11, fig. 36; p. lxxxii
Simoceras, 269; *Dumortieri*, *scissum*
simplex, *Sonninia*, Pl. 70, figs. 2, 3; Pl. 103, fig. 11; pp. 326, 390, 423
simplex, *Sonninia*, Pl. 70, fig. 4, see *sp.*, *Sonninia*
simplex, *Sonninia*, 353, 439
simplex, *Terebratula*, found outside Cotteswolds, 8
 simplification, stages of, excix
 Simpson, 85, 203
 Simpsoni, *Ammonites*, 226
 Sinon, *Harpoceras*, 227
Sinon, *Hudlestonia*, Pl. 38, figs. 13-16; p. 227
 Sinon, *Ludwigia*, 227
 Sinon, *Pelecoceras*, 175
 Siphonal lobe, augmentation of branches of, how caused, 217
 Size, acme of, cc
 Skeleton lobes, table (VIII) of, 443
 Skye, Isle of, lxx
 Slate, 48
 Smith, J. P., excix
 Smith, W., 242
 Smooth evolute stage, examples of, 289
 Smooth *Sonninia*, 448
 Snowhill Clay, date of, ccvii
 Snuff-Boxes, ccvii
 Sodbury, 163, 173, 209, 251, 252, clxxi; strata of, ccviii; see Little Sodbury
solaris, *Ammonites*, 241, clxxiv
solaris, *Dumortieria*, clxxiv
 Solid carina, 81, iv; see *carina*
 Solliès-Pont, 294
 Somerset, 7, 9, 10, 19, 40, 50, 51, 55, 71, 73, 75, 90, 97, 103, 114, 117, 120, 124, 168, 173, 175, 208, 214, 220, 251, 257, 266, 275, 281, 305, xiv, xv, xix-xxii, xxiv-xxvii, xlviii, liii, lvii, lx, lxvii, lxxiv, lxxvii, lxxxvi, xcvi, xcvi, cix, cxviii, cxxv, cxxviii, cxliv, cxlviii, cli, clxxii, clxxiv, clxxv, clxxix, clxxxv, exc, exciii, exciv; not to add shire, 359; strata of, ccvi, ccvii, ccviii, ccix
Sommerseatas, 359
Sonninia, p. 313; Suppl., p. cxci; *abnormis*, *acanthodes*, *alternata*, *arenata*, *attrita*, *boweri*, *brevispinata*, *biplicata*, *buckmanni*, *camura*, *contusa*, *costata*, *costigera*, *crassa*, *crassibullata*, *crassicostata*, *crassiformis*, *crassinuda*, *crassispinata*, *cymatera*, *decora*, *decorata*, *densicostata*, *diversa*, *dominans*, *dominata*, *dominatrix*, *dominica*, *dundriensis*, *duplicata*, *euromphalica*, *fissilobata*, *gibbera*, *inæqua*, *insignoides*, *irregularis*, *lævigata*, *loculosa*, *locuples*, *magnispinata*, *marginata*, *modesta*, *multicostata*, *multispinata*, *mutans*, *nodata*, *nuda*, *omphalica*, *obtusiformis*, *ovalis*, *palmata*, *papilionacea*, *parvicostata*, *paucino-*
data, *plicata*, *polyacanthus*, *ptyota*, *pustulifera*, *quadrifida*, *reclinans*, *reformata*, *regularis*, *renovata*, *revirescens*, *scalpta*, *semispinata*, *simplex*, *sowerbyi*, *sp.*, *spinea*, *spini-*
costata, *spinifera*, *spinigera*, *spinosa*, *sub-*
costata, *subdecorata*, *subirregularis*, *sub-*
marginata, *subsimplex*, *subspinosa*, *sub-*
striata, *sulcata*, *tridactyla*, *umbilicata*, *zur-*
cheri
Sonninia, 13, 14, 128, 265, 286, 287, cciii; descent of, 110; allied to *Pleuroceras* and *Amaltheus*, 110; from *Haugia*, 144; a cryptogenetic series, 314; spp. illustrate retrogression, 315; horizon of, at Dundry, 316; order of changes in retrogression, 316; groups of,

- how divided, 316; costata stock, 336; magnispinata stock, 341; biplicata stock, 344; crassa stock, 347; submarginata stock, 328; acanthodes stock, 331; and Dumortieria grammoceroïdes, 339; spinous species distinguished, 349; subdecorata stock, 357; omphalica stock, 362; quadrifida stock, 364; paucinodata stock, 368; species of different stocks, 372; revision, 379; and Hammatoceras, comparison of, 379; detailed classification of, 392; species innominatæ, 438; summary, 441; numerical details of, 441; skeleton outlines of lobes (Table VIII), 443; remarks on classification of, 444; analysis of species of, according to ornament, 447; how to analyse and identify species of, 448; further generic division of, required, 450; characters of different series in, 450; the species of Concavum zone, all new, 451; tuberculate core of, iv; likeness to Fontannesia, clxxxvii; classification, cxcviii
- Sonniniæ, revision of, new spp. of, 379; outline classification, 384-391; genealogical table, 445; divisions (ornament), 447; morphic equivalents (Table X), 449; generic subdivision possible, 450; migration of, 452; doubtful occurrence of, in Murchisonæ zone of Normandy, 452; extra-European spp. of, 453; dwarf, cxci; hemera, strata of, ccvii; sp. hemera, vi, ccv
- Sonninian Age, ccv
- Sonniniæ, 287, 293, 299, 302, 313, xiv; revision, 379; additions, cxcii; origin of, 288; geological position of, 292; literature on, 293; classification, cxcviii
- South America, 258, clxx; correspondence of faunal sequence in Europe and, 454
- South Cotteswolds, 163
- South Dorset, 324
- South Dorset coast, stratal succession, xxxv
- South Kensington Museum, 17
- South Petherton, 183, 184
- South Somerset, 61
- Sowerby, J., & J. D. C., 17, 56, 63, 149, 173, 174, vii, viii, xxv, lxx, lxxxvi, cxxxi
- Sowerbyi, Ammonites, 9, 13, 63, 315; group of, and Amaltheus, 130; remarks on the type specimen, 342; confusion concerning name of, 342
- Sowerbyi group, 143
- Sowerbyi, Hammatoceras, 13, 128, 287, 313, 342
- Sowerbyi, Harpoceras, 341, 342
- *Sowerbyi, Sonninia, Pl. 49, figs. 10-13
- Sowerbyi, Sonninia, 110, 315, 450
- Sowerbyi insignoides, Ammonites, 315
- Sowerbyi ovalis, Ammonites, 315
- Sowerbyi-zone, 4, 6, 8, 9, 63, 291; at Halfway House, thickness of, fossils of, 10; suggestions concerning, 292; and Concavum zone, 342
- sp., Canavarina?, Pl. 13, figs. 4, 5, p. 35 (Lioceras opalinum); Suppl., Fig. 133, p. clxvii; p. clxiii
- sp., Cosmogyria, Suppl., Pl. 14, figs. 11, 12; p. liv
- sp., Cotteswoldia, Pl. 31, figs. 13, 14, p. 179 (Grammoceras subserrodens); Suppl., Fig. 110, p. clxv; p. cxxxv
- sp. A., Dorsetensia, Pl. 52, figs. 1-3, p. 304, see Lennieri, D.
- sp. B., Dorsetensia, Pl. 52, figs. 4-7, p. 304
- sp., Dorsetensia, cxcii
- *sp., Dumortieria, Fig. 3, p. 187 [Foreign]
- sp., Dumortieria, Pl. 37, figs. 18, 19, p. 245, see costula, D.
- sp., Dumortieria, Pl. 45, figs. 15, 16, p. 241 (D. Levesquei); p. clxxvi
- sp., Dumortieria, Pl. 44, figs. 4-6, p. 255 (D. Moorei); Suppl., Fig. 182, p. cxevi; p. clxxxiii
- sp., Dumortieria, Pl. 43, figs. 1-4, p. 251 (Dum. radians); p. clxxxiv
- sp., Dumortieria, Pl. 42, figs. 1, 2 (Dum. radians) p. clxxx
- sp., Dumortieria, clxxv
- sp., Grammoceras, Pl. 32, figs. 11, 12, p. 191, see arcuata, Walkeria
- sp. A., Grammoceras, Pl. 34, fig. 12, p. 169 (G. toarcense); Suppl., p. cxxxii
- sp., Grammoceras, p. cxxxix
- sp., Harpoceras, xcii
- sp., Haugia, Suppl., p. xxix
- sp., Hyattina, Pl. 4, fig. 7, p. 22 (Lioceras bradfordense); Suppl., Pl. 17, fig. 29; p. cxxx
- sp., Lioceras, Pl. 14, figs. 7-9; see renovatum, Cypholloceras
- sp., Lioceras, Pl. 14, fig. 12, p. 53 (L. opalinum var. comptum); Suppl., Pl. 10, fig. 9; p. xlii
- sp., Lioceras, xlvi

- sp.*, *Ludwigia*, Pl. 23, figs. 2-4, p. 107, see *sp.*, *Witchellia*; Pl. 23, figs. 9, 10, p. 107, see *Witchelli*, *Brodiceras*
- sp.*, *Ludwigia*, xxxiii
- sp. A.*, *Platygraphoceras*, Pl. 15, figs. 9, 10, p. 76 (*Lioceras apertum*); Suppl., Fig. 56 in text, p. xciv
- sp. A.*, *Pleydellia*, Pl. 30, figs. 11, 12, p. 198 (*Grammoceras subcomptum*); Suppl., Fig. 118, p. clxvii; p. cxxxviii
- sp. B.*, *Pleydellia*, Pl. 31, figs. 7-9, p. 179 (*Grammoceras subserrodens*); Suppl., Fig. 120, p. clxvii; p. cxxxix
- sp.*, *Pseudogrammoceras*, Suppl., p. clii
- sp.*, *Pseudogrammoceras*?, Pl. 29, figs. 6, 7, p. 182 (*Grammoceras doerntense*); Suppl., Fig. 153, p. cliv
- **sp.*, *Pseudographoceras*?, Suppl., p. xci [Foreign]
- sp.*, *Pseudographoceras*, ccii
- sp.*, *Sonninia*, Pl. 72, figs. 1, 2, p. 439; Pl. 79, figs. 7, 8, p. 439; Pl. 89, figs. 9, 10, p. 439; Pl. 67 figs. 1, 2, p. 438 (*S. dominans*); Pl. 103, fig. 24 (*S. aff. dominans*); Pl. 67, figs. 3, 5; Pl. 103, fig. 20, p. 438; Pl. 70, fig. 4, p. 439 (*S. simplex*); Pl. 95, figs. 9, 10, p. 440; Pl. 97, fig. 5, p. 440; Pl. 103, fig. 19, p. 440
- sp. Sonninia*, Pl. 22, fig. 34; Pl. 23, figs. 7, 8, see *aff. Buckmanni*, S.; Pl. 23, figs. 5, 6, see *dundriensis*, *Sonninia*; Pl. 85, figs. 7, 8, see *obtusiformis*?, S.; Pl. 78, figs. 6-9; Pl. 88, fig. 4; see *subirregularis*, S.
- sp.*, *Sonninia*, cxci
- sp.*, *Walkeria*, Pl. 30, fig. 10, p. 199 (*Grammoceras lotharingicum*); Suppl., Fig. 124, p. clxvii; p. cxl
- sp.*, *Witchellia*, Pl. 23, figs. 2-4, p. 107 (*Ludwigia sp.*); Suppl., p. cxci
- sparsicosta*, *Dumortieria*, Pl. 45, figs. 17-20, p. 239
- Specific characters of *Lioceras*, xxxvi
- Specific distinction, cxci
- Specific descriptions, interpretation of, cciii
- Specific development, and difference in description, xciv
- Species, additional, clxi
- Species, new, protests against, cause of trouble, 379
- Sphaeroceras*, 140, ccii; *brongniarti*, *gervillii*, *wrighti*
- Sphaeroceratoid*, ccii
- sphaeroidalis*, *Terebratula*, 5
- Spina*, iii
- **spinatum*, *Paltopleuroceras*, Pl. 49, fig. 7, p. 295
- spinatum*, *Pleuroceras*, Pl. 49, fig. 7, see *spinatum*, *Paltopleuroceras*
- spinatum*, *Pleuroceras*, 241, 287, 291, 295
- Spinatum zone*, 133, 163, 283, 291
- spinea*, *Sonninia*, Pl. 86, figs. 4-6; Figs. in text, 12, p. 386; 38, p. 406; 64, p. 443; pp. 387, 405
- Spines*, 405; see also *bullae*, *nodus*, *nonseptituberculate*, *papilla*, *septituberculate*, *tuberculate*, *spina*; hollow as compared to solid, 314; strongly marked ribs homologous to, 345; aborted, 342; furcation of, note on, 378; how to preserve, 413
- Spinicostae*, 357
- spinicostata*, *Sonninia*, Pl. 73, figs. 4-6; pp. 337, 387, 405
- Spinicostate*, 405
- spinifera*, *Sonninia*, Pl. 50, figs. 14, 15; Pl. 74, figs. 4-6 (*S. spinigera*); Pl. 100, figs. 1-4; pp. 335, 390, 418
- spinigera*, *Sonninia*, Pl. 74, figs. 4-6, see *spinifera*, S.
- spinosa*, *Rhynchonella*, 165
- spinosa*, *Sonninia*, Pl. 81, figs. 7-9; pp. 365, 384
- Spinous*, 405
- Spiral angle*, 135, 137
- Spirula*, 454, 455
- Spissicostate* (series of *Dumortieria*), clxxix
- Spissicostation*, clxxii
- Sports*, 289
- Spontaneous variation*, 289
- Stage of atavistic senility*, 357
- Stage*, *Aalenian*, *anagenetic costate*, *arietan*, *Bajocian*, *Bathonian*, *bispinous*, *catagenetic costate*, *globose*, *goniatite*, *grammoceran*, *lioceran*, *multispinous*, *nodate*, *parvituberculate*, *paucicostate*, *phylogerontic*, *postnodate*, *renovate*, *smooth-evolute*, *striate*, *Toarcian*, *tuberculate*, *unispinous*
- Stages*, ccv; omission of, from ontogenetic record, 289; dissimilar, elimination of, 290
- Stahl*, 241, 242
- Stanley*, 279
- Standish Beacon*, xxxiii, xlv

- Steinmann, Dr. G., 453
steinmanni, Canavarina, Suppl., Fig. 130, p. cxlii
 Steinmanni, Harpoceras, cxlii
stellaris, Ammonites, 226
 Stenogyral, ii, cxcvii
Stephanoceras, 14, 45, 46, 47, 129, 271; *blagdeni*,
braikenridgii, *brodiei*, *bullatum*, *humphriesi-*
amum, *platystomum*, *punctum*, *subcoronatum*,
zigzag; zone, 4; and *pettos*-*Blagdeni* radical,
 271; and *Parkinsonia*, common origin of,
 271; polygenetic origin of, 272; depressed
 band on middle of abdomen of, 272
Stephanocerata, not one group, 272
Stephanocertinae, 14
Stephanoceratites zone, 4
Stephens, Darell, 237, 242, 245, 298, 340, 359,
 362, 377, lxiv, lxxix, lxxxiv, xcvii, cxi, cxii,
 cxvi, cxx, cxxiv, clxxviii; collection, 292; see
 Darell, Darell Stephens
Stephensi, Rhynchonella, xxxvii
stephensi, Vacekia, Suppl., Pl. 10, figs. 17-19;
 Fig. 156, p. clxvii; Fig. 162, p. clvii
Stepheoceras, cc; tuberculate core of, iv
stigmatosum, Graphoceras, Pl. 9, figs. 5, 6, p. 68
 (*Lioceras concavum*, var. *v-scriptum*); Suppl.,
 Fig. 59 in text, p. xcvi
aff. stigmatosum, Graphoceras, Pl. 9, figs. 8-10,
 p. 56 (*Lioceras concavum*); p. xcvi
Stinchcombe, section of, 47
Stinchcombe Hill, 55, 86, 158, 173, 176, 208, 209,
 213, 239, 279, xxix, xxxix, cxlviii, cxlix, clii,
 clvi, clx
Stoford, 19, 61, 71, 75, 214, 257, 266, xxxviii,
 lxvii, lxxiv, lxxvii, lxxxviii, xcvii, ci, cxviii,
 clxxv, clxxxv, cxc; strata of, ccviii
Stoke Knap, 26, 40, 51, 399, 401, xxvii, xlviii, lii,
 lx, lxviii, lxxi, lxxv, lxxviii, lxxxiii, lxxxvi,
 lxxxvii, lxxxviii, lxxxix, xc, xcii, xciv, xcvi,
 civ, cvi, cviii, cix, cx, cxii, cxiv, cxvi, cxviii,
 cxxix, clvii, cxcii; sands at, 51; species from
 sands at, 52; strata of, ccvii
Stokeia, Suppl., p. cxxvii; *marmorea*, *subacuta*
Stokeia, classification, cxviii
Strangwaysi, Harpoceras, note concerning original
 specimen, 138
Strasburg Museum, 264
Strata on Dorset Coast, thickness of, clxxxiii
Stratal succession, xxxv
Stratigraphical position, ccvi
Stratigraphical terms, ccv
Stria, iii
Striae and radii, 57
striaries, Agassiceras, 226; Ammonites, 289
striata, Trigonina, 46
Striate Ammonites, xli
Striate (series of Dumortieria), clxxx
Striate species, xxxvi
Striate stage, examples of, 289; species, xl
Striation, cc
Striatuli hemera, vi, xii, cliv; strata of, ccviii
striatulocostata, Dumortieria, Pl. 37, figs. 16, 17,
 see *yeovilensis*, D.; Pl. 40, figs. 1, 2, *externi-*
costata, D.; Pl. 40, figs. 3-8, *mutans*, D.; Pl.
 40, figs. 10-12, *declinans*, D.; p. 243, see spp.
 above
striatulocostata, Dumortieria, clxxvii, clxxviii
striatulo-costatus, Ammonites, 237, 255, clxxv
Striatulum beds, 50, 51, 164, 165; at Midford,
 113; absent from Haresfield, 166; of York-
 shire, 188
striatulum, Grammoceras, Pl. 26, figs. 8-10; Pl.
 28, figs. 18, 19; p. 173; Suppl., p. cxxxii
striatulum, Grammoceras, Pl. 28, figs. 16, 17, see
penestriatulum, G.; Pl. 28, figs. 20, 21, *are-*
nacea, Canavarella; p. 173, see spp. above
striatulum, Grammoceras, 12, 44, 45, 46, 49, 50,
 158, 164, 165, 173, 222, xii, cxxix, cxxxii; in
 Lias and Inferior Oolite, how mistake arose,
 175; position in regard to sands, 175; mis-
 take for Dumortieria, xciv; (hemera), ccv
Striatulum group, 163
striatulum, Harpoceras, 45, 170, 174, 182
Striatulum subzone, 43, 45, 46, 49, 50, 52; cor-
 rection, 166
striatulum, var. *comptum*, Harpoceras, 170
striatulus, Ammonites, 49, 173, 174, 252; (Harpoc-
 ceras), 174
Striatulus shales, 167, 168
striatulus, Ammonites, range of, in Cotteswolds,
 49
striatum, Lioceras, Pl. 13, fig. 6, p. 35 (*L. opa-*
linum); Pl. 13, fig. 12, p. 54 (*L. opalinum*
 var. *comptum*); Suppl., Pl. 10, fig. 10; p.
 xlii
striatum, Liparoceras, 287; and modifying action,
 289

- Strickland, H. E., and rules of nomenclature, 14
 Strigoceras, *cci*; *trifurcatum*, *truellii*
 Striicosta, *iii*
Strophogyria, *Suppl.*, p. *lxii*; *agria*, *cosmia*, *pinax*
 Strophogyria, classification, *cxcviii*
 Stroud, 64, 90, 91, 94, 96, 100, 229, 231, 239, 242, 245, 251, 252, 253, 258, 275, 279, 281, *xxvi*, *xxvii*, *xlii*, *civ*, *cx*, *cxxx*, *cxlix*, *clxi*, *clxix*, *clxx*, *clxxi*, *clxxvii*, *clxxix*
 Stroud Hill, section of, 7
 Stroud Valley, 175
 Struckmanni, Ammonites, 206, *cxlviii*; (? *Harpoceras*), 205
 Struckmanni hemera, *vi*, *cliv*; *strata* of, *ccviii*
struckmanni, *Pseudogrammoceras*, p. 206 (*Grammoceras fallaciosum* var. *Struckmanni*); *Suppl.*, *Fig. 143*, p. *clxvii*; p. *cxlviii*
 Struckmanni, *Pseudogrammoceras* (hemera), *ccv*
 Stubbington, F., 214
 Stürtz, *cxlviii*
 sub-, use of, *cxcvii*
subacuta, *Manselia*, *Suppl.*, *Pl. 13*, *figs. 4-3*, p. *lviii*
subacuta, *Stokeia*, *Suppl.*, *Pl. 17*, *figs. 10-12*; p. *cxxviii*
 Subalticarinata, *cvi*, *cxi*; (series), *cxi*, *cxii*, *cxiv*
 subangulata, *Rhynchonella*, 8, 43
 Subangustumbilicate, *cxcvii*
 Subannular radii, 267
subaratum, *Catullocceras*, *Pl. 39*, *figs. 1, 2* (*Dumortieria arata*); p. 280 (*Catullocceras aratum*); *Suppl.*, p. *clxxii*
 subaratum, *Catullocceras*, *clxxii*
 Subarcuate ribbing, 125; ribs, 158
 Subarcuate (series), *cix*
subcandida, *Cotteswoldia*, *Pl. 32*, *figs. 7, 8*, p. 192 (*Grammoceras aalense*); *Suppl.*, *Fig. 106*, p. *clxv*; p. *cxxxv*
 Subcarinate (series), *xvi*
 subcarinatum, *Phylloceras*, 119
 subcarinatus, Ammonites, 119
subcava, *Hyattia*, *Suppl.*, *Fig. 13* in text, p. *lvi*
subcompta?, *Pleydellia*?, *Pl. 30*, *figs. 13, 14*; p. 198 (*Grammoceras subcomptum*); *Suppl.*, *Fig. 117*, p. *clxvii*; p. *cxxxviii*
subcomptum, *Grammoceras*, *Pl. 30*, *figs. 11-14*, p. 198, see **subcompta**, *Pleydellia*
subcomptum, *Grammoceras*, *cxxxviii*
subcomptum, *Harpoceras*, 198, 248
 Subconcaumbilicate, *v*
 subcontractus, *Macrocephalites*, hemera, *ccv*
subcornuta, *Apedogyria*, *Suppl.*, *Pl. 14*, *figs. 13-15*; p. *lx*
 subcoronatum, *Stephanoceras*, 272
subcostata, *Sonninia*, *Pl. 71*, *figs. 4, 5*; *Pl. 103*, *fig. 6*; pp. 330, 387, 415
 Subcostate, *Sonninia*, 448
 Subcostate species, *xxxvi*
 Subcostation, *cc*
subcostosum, *Lioceras*, *Pl. 20*, *figs. 11, 12*, p. 102 (*Ludwigia costosa*); *Suppl.*, *Pl. 6*, *figs. 5-7*; p. *xxxvii*
 Subcrassicarinate (series), *cxxi*
 Subcrassicostate, *ix*
 Subcrassornate, *x*
 subdecorata beds, date of, *ccvii*
 subdecorata, *Rhynchonella*, 8
subdecorata, *Sonninia*, *Pl. 84*, *figs. 9-11*; *Figs. in text*, 16, p. 388; 42, p. 412; 68, p. 443; pp. 361, 412
 subdecorata stock, 357; distinction of species in, 357; ontogenetic stages of, described, 358
 Subdirect ribs, 231
subdiscoideum, *Deltoidoceras*, *Pl. 19*, *figs. 5, 6*; *Pl. 20*, *figs. 1, 2*; p. 100 (*Hyperlioceras subdiscoideum*); *Suppl.*, *Fig. 82*, p. *clxv*; p. *cxviii*
subdiscoideum, *Hyperlioceras*, *Pl. 19*, *figs. 5, 6*; *Pl. 20*, *figs. 1, 2*, p. 100, see **subdiscoideum**, *Deltoidoceras*
 subdiscoideum, *Hyperlioceras*, *cxviii*
subexcentrica, *Dumortieria*, *Pl. 30*, *fig. 19*; *Pl. 44*, *figs. 7, 8*, p. 255 (*Dumortieria Moorei*); *Suppl.*, *Fig. 180*, p. *cxcvi*; p. *clxxxii*
subfalcata, *Manselia*, *Suppl.*, *Pl. 11*, *figs. 25-27*; *Fig. 15* in text, p. *lviii*
 Subfalcate to subarcuate (series), *cix*
 Subfalciradiate (series), *lxxix*, *cxv*, *clvii*
subfallaciosum, *Pseudogrammoceras*, *Pl. 33*, *figs. 17, 18*; p. 204 (*Grammoceras fallaciosum*); *Suppl.*, *Fig. 141*, p. *clxvii*; p. *cxlvii*
 Sub-family, 14, *cxcviii*
subfasciata, *Dumortieria*, *Pl. 30*, *fig. 18* (*Dum. radiosa*); p. 254 (*Dum. radiosa*, var. *gundershofensis*); *Suppl.*, *Fig. 177*, p. *cxcv*; *Fig. 178*, p. *clxxxii*

- Subflexicostate (series, Fontannesia), cxc
 Subflexiradiate (series of Dumortieria), clxxxiv ;
 (Pseudogrammoceras series), cxlvi
 subfurcatum, Cosmoceras, 10
 subglabra, Walkeria, Pl. 13, figs. 7-10, p. 35
 (Lioceras opalinum); Figs. 125, 126, p.
 clxvii; p. cxli
 Sub-groups, generic, 15
 Subirregulariornate, x
 subirregularis, Sonninia, Pl. 77, figs. 6-9 (S. sp.);
 Pl. 88, fig. 4 (S. sp.); Pl. 98, figs. 4, 5; Figs.
 in text, 24, p. 390; 50, p. 424; 76, p. 443; p.
 426
 Sublatumbilicate, cii, cxcvii; (series), cii
 Subleptogyral, cxcvii
 subleve, Hyperlioceras, Pl. 17, fig. 5; Pl. 18, fig.
 3; p. 94 (H. discites); Suppl., Fig. 93, p.
 clxv; p. cxxiii
 sublineata, Brasilia, Pl. 8, figs. 5, 6; p. 72 (Lio-
 ceras concavum var.); Suppl., Fig. 40 in text,
 p. lxxx
 sublineatum, Lytoceras, 45, 46
 submarginata, Sonninia, Pl. 71, figs. 1-3; pp. 329,
 387, 406
 Submarginata stock, 328
 submaxillata, Terebratula, 43
 subobsoleta, Ludwigella, Suppl., Pl. 19, figs. 4-6;
 p. lxxxviii
 Subornate, iv, ix
 subornatum, Dissoroceras, Suppl., Fig. 77; p.
 cxv
 Subpachygyral, cxcvii
 subplanatum, Harpoceras, 38, 216, 217
 Subpaucicostate, ix; (series), xcv
 Subplatygyral, cxcvii
 subquadrata, Braunsina?, Suppl., Pl. 20, figs. 10-
 12; p. ci
 subquadratum, Grammoceras, Pl. 36, figs. 3-5, p.
 202, see subquadratum, Pseudogrammoceras
 subquadratum, Grammoceras, cxlv
 subquadratum, Pseudogrammoceras; Pl. 36, figs.
 3-5, p. 202 (Grammoceras subquadratum);
 Suppl., Fig. 135, p. clxvii; p. cxlv
 subradiatus, Ammonites, 13, 20
 Subrecticostate (series Fontannesia), cxc
 subrudis, Ludwigella, Pl. 15, figs. 14, 15; Suppl.,
 Fig. 52 in text, p. lxxxvii
 Subrursiradiate, x
 subsectum, Deltotoceras, Pl. 19, figs. 3, 4; p. 98
 (Hyperlioceras discoideum); Suppl., Fig. 86,
 p. clxv; p. cxxi
 subserrodens, Amaltheus, 179, cxliii
 subserrodens, Grammoceras, Pl. 31, figs. 5, 6, 10-
 12, venustula, Canavarina; Pl. 31, figs. 7-9,
 sp., Pleydellia; Pl. 31, figs. 13, 14, sp., Cottes-
 woldia; p. 179 see spp. above
 subserrodens, 222, 223, cxxxv; Grammoceras,
 cxxxix, cxliii
 subsimplex, Sonninia, Pl. 95, figs. 6-8; Figs. in
 text, 25, p. 390; 51, p. 424; 77, p. 443; p.
 427
 subsimplex, Sonninia, 328
 subsolaris, Dumortieria, Pl. 37, figs. 6-8; p. 241
 (Dum. Levesquei); p. clxxiv
 subspinatum, Haplopleuroceras, Pl. 49, figs. 5, 6;
 Pl. 51, figs. 1-10, 11-13; p. 300
 subspinatum, Haplopleuroceras, 287, 303
 subspinatum, Pleuroceras, 300
 subspinatus, Amaltheus, 300
 subspinosa, Sonninia, Pl. 49, figs. 8, 9; Pl. 84,
 figs. 4-6; pp. 358, 387, 412
 subspinosa, Sonninia, 287
 Subspissicostate, Biarciradiata, cxi
 Subspissicostate (series), xcvi, cxi
 Sub-stages, tuberculated, 405
 Substenogyral, cxcvii
 substriata, Sonninia, Pl. 70, figs. 6, 7; Pl. 71, figs.
 6-8; pp. 330, 387, 406
 substriata, Sonninia, 353
 substriatum, Ancolloceras, Suppl., Pl. 6, figs. 14-
 16; p. xlviii
 subtabulata, Cosmogoria, Suppl., Pl. 4, figs. 13-
 15b; p. liii
 Subtabulate, cvi; (series), ciii
 subtectata, Dorsetensia, Pl. 54, figs. 3-5; Pl. 55,
 figs. 1, 2; p. 309
 Subtriangularia, cxxii
 Sub-tribe, 15
 Subtuberculate, ix
 subundulata, Dumortieria, Pl. 45, figs. 1-3; p.
 259; p. clxxxvi
 subundulata, Dumortieria, Pl. 43, figs. 8-10, see
 latescens, D.; Pl. 44, figs. 10-12, munda, D.;
 Pl. 45, figs. 4, 5, 10-12, rustica, D.; Pl. 45,
 figs. 6, 7, exacta, D.; Pl. 45, figs. 8, 9, Brancoi,
 D.; p. 259, see spp. above

subundulata, Dumortieria, clxxxv, clxxxvii; Haug's criticism of a specimen, 261
 Subundulata series, clxxxiv, clxxxv
 subundulata, var. externicompta, Dumortieria, 259
 subundulata, var. externicostata, Dumortieria, 243, 259, clxxvii
 subundulata, var. striatulocostata, Dumortieria, 243
 subundulatum, Harpoceras, clxxxvi
 subundulatum, var. externecomptum, Harpoceras, 259, clxxxi
 subundulatum, var. externe-costatum, Harpoceras, 243, 259, clxxvii
 subundulatum, var. externepunctum, Harpoceras, 196, 260
 Sub-zone, 2, 10; striatulum, variabilis, 46
 suevica, Dumortieria, 252
 sulcata, Lillia, Pl. 22, figs. 32, 33; Pl. 23, fig. 1, p. 109, see sulcata, Sonninia
 sulcata, Lillia, cxci
 sulcata, Sonninia, Pl. 22, figs. 32, 33; Pl. 23, fig. 1; p. 109 (Lillia sulcata); Suppl., p. cxci
 sulcata, Sonninia, xiv
 Sulcate, iv
 Super-family, cxcviii
 superba, Cotteswoldia, Pl. 32, figs. 1, 2; p. 192 (Grammoceras aalense); Suppl., Fig. 107, p. clxv; p. cxxxiv
 Sutner, 267
 Sutneri, Ammonites, 82; Parkinsonia, 272; Tmetoceras, 282, 285
 *Sutneri?, Witchellia, Pl. 49, figs. 14-17
 Sutneri, Witchellia, 304
 Suture, reasons for development in complication, 134
 Suture-line, cxci; and lobes, 134; stretching of, 180; development of, 217; as criterion of affinity, i; importance of, i; oblique lobes, clxix; characters of, cc
 Swabia, 238, 258, xvii
 Swabian Alps, 49
 Symondsburry, xxxvii, lviii
 Symonsbury Hill, 274

Tables:

- Table I.—Varieties of *Lioc. concavum*, 74
 Table II.—Genealogical, 131

Table III.—Hildoceratidæ, 132
 Table IV.—The Grammocerata, 221
 Table V.—The Polymorphidæ, 282, 283
 Table VI.—Relationship of Amaltheidæ, 291
 Table VII.—Genealogy of Dorsetensia, 312
 Table VIII.—Sonniniæ, skeleton lobes of, 443
 Table IX.—Sonniniæ, genealogical, 445
 Table X.—Morphic equivalents, 449
 Suppl. Table I.—Radial lines, Hildoceratidæ, clxiii
 Suppl. Table II.—Radial lines, Hildoceratidæ, clxv
 Suppl. Table III.—Radial lines, Hildoceratidæ, clxvii
 Suppl. Table IV.—Radial lines, Polymorphidæ, Oppelidæ, cxvi
 Suppl. Table.—Correlation of deposits, ccvi
 tabulata, Dumortieria, Suppl., Pl. 22, figs. 25-27; p. clxxxv
 tabulatum, Dissoroceras, Pl. 21, figs. 5, 6; p. 104 (Ludwigia Lucyi); Suppl., Fig. 76, p. cxlv; p. cxv
 Tabulate, iv; see penetabulate, subtabulate
 Tabulate and penetabulate, cvi
 Tabulate periphery described, cv
 Tabulation of area, cvi
 Tachygenesis, ccii; in decline of certain features, cxxxvii
 Tate and Blake, 13, 61
 Taylora and Cosmoceras, Haug location of, criticism on, 270
 tecta, Dorsetensia, Pl. 56, figs. 2-5, p. 311
 tenerum, Toxolioceras, Suppl., Fig. 98, p. cxxvii
 Tenuia, cxlvi
 tenuis, Ludwigella, Suppl., Pl. 20, figs. 37-39; p. lxxxvii
 Terebratula, 47
 Terminal lobule, 364
 Terminals (of stocks), xcix
 Terms, see acme, alticarina, anagenesis, anaplasia, anguliradiata, anguliradius, angustilobate, angustumbilicate, annular, arcuate, bispinous, bitabulate, bituberculation, brachysceles, brephic, bulla, bullicostæ, bullicostate, caduceiform, carinati-bisulcate, carinati-convex, carinatisulcate, carinatitabulate, catabatic, catagenesis, cataplasia, coiling in, coiling out, concave, concavifastigate, concavumbilicate,

concentric, concentrilatumbilicate, concentumbilicate, conch, convex, convexifastigate, costa, costistria, crassicarinate, crassicostate, crassornate, craterumbilicate, cruciform, deltiaradiate, deltoid, densicostate, densisept, direct, distincticarinate, η , earlier inheritance, ectobrachysceles, endobrachysceles, epacme, ephobic, equicellate, equiposed, excentric coiling, excentrilatumbilicate, excentrumbilicate, extreme, extreme-latumbilicate, extreme-pachygyral, falcate, falciform, falciradiate, fastigate, flexicostate, flexiradius, gammiradiate, gerontic, gradumbilicate, hemera, hollow-carina, homœomorph, homœomorphous, homœomorph, hypostrophic, inæquiornate, incoiling, inornatilibate, interlobular, intra-axial, irregulari-ornate, isosceloid, L, l, lævigatæ, lævigatilibulate, latangulate, latilobate, latisept, latumbilicate, leptogyral, lithic, magnilobate, metaplasia, morphanagenesis, morphic equivalents, m. prefiguration, m. representation, morpho-, morphogenesis, morphogeny, morphological equivalents, etc. = morphic, multispinous, multituberculation, neanic, nodicostæ, nodicostate, nodus, nonsepticarina, nonseptituberculate, nontuberculate, oligogyral, ornatilibate, outcoiling, pachygyral, palmate, papilla, paracme, parvicarinate, partition-band, parvicarina, parvicostate, parvilobate, parviornate, parvituberculate, paucicostate, pauciseptate, pedigerous, penetabulate, per-, perangustumbilicate, perlatumbilicate, perleptogyral, perpachygyral, perplatygyral, perstenogyral, phylembryonic, phylephobic, phylhypostrophic, phylobrephic, phyllocatabatic, phylogerontic, phyloneanic, planate, planifastigate, platygyral, pœcilmorphy, polygyral, postnodate, prorsicostate, prorsiradiate, prorsiradius, radial curve, r. line, radius, reclined ribs, rectiradiate, rectiradius, regulariornate, rursicostate, rursiradiate, rursiradius, rursisubflexiradiate, septicarina, septituberculate, sessile, solid carina, spina, spinicostæ, spissicostate, stria, striicostæ, subalticarinate, subangustumbilicate, subannular, subarcuate, subcarinate, subconcaumbilicate, subcostate, subcrassicarinate, subcrassicostate, subcrassornate,

subdirect, subfalcate, subfalciradiate, subflexicostate, subflexiradiate, subirregulariornate, sublatumbilicate, subleptogyral, subornate, subpachygyral, subpaucicostate, subplatygyral, subrecticostate, subrursiradiate, subspissicostate, substenogyral, subtabulate, subtuberculate, tabulate, tachygenesis, to, tortiradiate, tortiradius, tuberculate, ultra-axial, umbilicus concentric, u. excentric, undulate, unispinous, unituberculate, ventrally inclined, ventrally projected, versiradiate, versiradius, v-script, v-shaped

Terms, quarrymen's, 48

Terms of auxology, 357

Terms, technical, cxcvii; hemeral, ccv; stratigraphical, ccv

Tessonianus, Ammonites, 309, 310

Test-ornament, cxcix; characters of, cc

Tetrabranchiata, 126

Thiollière, 273, 277

Thompson, Beeby, 40, 53, xviii; on Am. bifrons, 48; on Am. opalinus, 52; and Lioceras comptum, 55; on Northampton strata, xv; and Lioceras Thompsoni, xl

thompsoni, Lioceras, Suppl., Pl. 7, figs. 13-16; p. xl

Thone, 5

Thouars, 172

Thouarsense, Grammoceras, 170

Thouarsensis, Ammonites, 169, 170, cxxxii

Thuringia, Grammoceras in, 169

thrasu, Pseudogrammoceras, Pl. 36, figs. 6-8; Suppl., Fig. 136; p. cxlv

Tilly-sur-Seulles, clxxiv

tirolense, Phymatoceras, xxx

tirolensis, Ammonites, 109, vii, x, xi

tirolensis, Am. (Dum.), need for new name for, xxx

Title, explanation of, cciv

Tmetoceras, p. 269; Suppl., p. clix; circulare, hollandæ, regleyi, sciassum, sutneri

Tmetoceras, clxix; from allies, 267; classification, cxviii

to = passing on to become, 341, 342

toarcense, Grammoceras, Pl. 34, fig. 12, see sp. A. Grammoceras; Pl. 28, figs. 4, 5, see audax, G.; Pl. 28, figs. 7-13, toarciense, G.; p. 169, see spp. above

- toarcense, *Grammoceras*, 165, 221, 222, 305, cxxxi, cxxxii; and *Orbigny*, connection between, table, 183; in *Lias* and *Inf. Oolite*, how mistake arose, 175
- toarcense-striatulum, note on term, cxlvi
- toarcense-striatulum, *Grammoceras*, Pl. 28, figs. 14, 15, p. 173, see *explicatum*, *Pseudogrammoceras*
- toarcense-striatulum, *Grammoceras*, 165, cxlvi
- toarcensis, *Ammonites*, 172; *Lima*, 172
- Toarcian, 220; value of term, 173; stage, ccv
- Toarcien, equivalents of, 173
- toarciense, *Grammoceras*, Pl. 28, figs. 7-13, p. 169 (*G. toarcense*); p. cxxxii
- toarciensis, note on word, 173
- Toarcium, 172
- tolutarium, *Rhæboceras*, Suppl., Pl. 11, figs. 4-6; p. lxxiii
- tolutarius, *Ammonites*, lxxii, lxxiii
- toma, *Canavarella*, Suppl., Pl. 22, figs. 16-18; p. cxxix
- torquata, *Denckmannia*, Suppl., Pl. 3, figs. 4-6; p. xix
- torquata, *Denckmannia*, ix
- Tortiradiata (series), lxxiv
- Tortiradius, position of, in regard to other forms of radii, lxxiv
- tortiva, *Fontannesia*, Pl. 47, figs. 8, 9; p. 262 (*Dumortieria grammoceroides*); p. cxc
- tortum, *Rhæboceras*, Suppl., Pl. 11, figs. 1-3; Fig. 28 in text; p. lxxii
- torulosum, *Lytoceras*, 50, 51, 52
- torulosus, *Ammonites*, 45, 49; zone of, 49
- Torulosus bett, 2
- Toulon, 294, 295, 299
- toxeres, *Darellia*, Suppl., Pl. 18, figs. 13-15; p. cxiii
- Toxolioceras, Suppl., p. cxxvi; incisum, mundum, tenerum, *walkeri*; classification, cxviii
- Transverse ornament, cc
- Trent, 114, 175, 281, xiv
- Triangle, inverted, 360
- Triangles, proportional, cxvii
- triangulare, *Deltotoceras*, Fig. 84, p. cxx
- Tribe 14
- trichina, *Manselia*, Suppl., Pl. 10, figs. 14-16, p. lix
- tridactyla, *Sonninia*, Pl. 101, figs. 1-3; pp. 384, 393
- trifoliatum, *Phylloceras*, 301
- trifurcatum, *Strigoceras*, cci
- Trigonia-grit, Lower, ccix; for *Lioceras concavum*, 62; and *Fontannesia*, cxc; date of, ccvii
- Trigonia-grit, Upper, 7, ccix; age of, 91; date of, ccvi
- Trigonia grits and Dorset Cephalopod bed, 3
- Trigonia navis, zone of, 49; beds, 258
- Trimarginate, 132
- trimarginatum, *Harpoceras*, 13
- trimarginatus, *Ammonites*, 127, 129
- Trinomial nomenclature, remarks on, 315
- Tropiditæ, 14
- Tropidoceras, 13, 14, 127
- Trotternish, lxx
- Truelli, *Ammonites*, confounded with *Hyperlioceras discoideum*, 92, 99
- Truelli hemera, vi; strata of, ccvi
- truelli, *Strigoceras*, cci; hemera, ccv
- tuberata, *Kiliania*, Suppl., Pl. 15, figs. 1-3; p. lxvi
- tuberculata, *Ludwigia*, Pl. 3, figs. 4, 5; Pl. A, fig. 2; p. 17 (*Ludwigia Murchisonæ*, var. *obtusa*); Suppl., Pl. 11, fig. 30; p. lxix
- Tuberculate, iv
- Tuberculate *Sonniniæ*, 447
- Tuberculate costate *Sonniniæ*, 447
- Tuberculate stage, 405; in *Grammoceras*, cxxx
- Tuberculation, iii
- tumefacta, *Denckmannia*, Suppl., Pl. 1, figs. 7-10; p. xix
- tumefacta, *Denckmannia*, ix
- tumidus, *Spirifer*, 258
- Turbo, 46
- turgidus, *Amaltheus*, 291
- Turrilites, 381
- Tutcher, J. W., and Dundry specimen, 434; and *Brasilina Tutcheri*, lxxxiii, lxxxiv; and *Fontannesia* at Dundry, clxxxviii, cxc; and photographs, cxcii
- Tutcheri, *Brasilina*, Suppl., Figs. 44, 45 in text, p. lxxxiii (? Suppl., Pl. 10, figs. 35-37, p. cxxx)
- Type-species, cciii
- Typical series (*Fontannesia*), clxxxviii
- Ubal, 294

- *Ubaldi, Zurcheria**, p. 298 [Foreign]
 Ubaldi, Zurcheria, 291, 293, 294, 295, 297
 Ultra-axial, 369
 ultramontanum, Phylloceras, 301
 Umbilical catagensis, ccii
 Umbilical closing, ccii
 umbilicata, Ludwigina, Suppl., Fig 18 in text, p. lxi
 umbilicata, Sonninia, Pl. 84, figs. 1-3; pp. 385, 397
 Umbilicate species, clxxxiii
 Umbilicate (series of Cotteswoldia), cxxxv; see also Augustumbilicate, concavumbilicate, concentumbilicate, concentri-latumbilicate, craterumbilicate, excentrumbilicate, excentri-latumbilicate, gradumbilicate, latumbilicate, subconcavumbilicate
 Umbilication, excix, cci; renewal of, in age, 140
 Umbilicus, changes in, 36; expansion of, 140, 312—Hyatt's explanation of, 312; concentric, 323; excentric, 323; comparison of dimensions of, in modesta and simplex, 327; comparative measurements in nuda, simplex, substriata, 353; terms for, iv; change of, with age, v; expansion of, v, cxliv; expansion of, hypostrophic, lxxii; progressive decline of, lxxxix; relative time of expansion of, cxliv; expansion of, remarks on, cxliv; opening out, ccii; a character of distinction, cciv
 Umbria, 220
 uncinatum, Lioceras, Suppl., Pl. 5, figs. 7-11; p. xxxvi
 uncum, Lioceras, Suppl., Pl. 6, figs. 8-10; p. xxxvii
 undatum, Cylicoceras, Suppl., Pl. 5, figs. 5, 6; p. 1
 Undulate ribs, 307
 undulatum, Graphoceras, Pl. 10, fig. 9; Pl. A, fig. 19; p. 56 (Lioceras concavum); p. xcvi
 undulatum, Lioceras, Suppl., Pl. 9, figs. 1-3 (13, 14?); p. xxxix
 undulatus, Ammonites, 241, 242, 246
 Unispinous stage, 288; examples of, 289
 Unituberculation, cc
 Upper beds, ccix
 Upper Inferior Oolite, ccv
 Upper Freestone, 7
 Upper Leda-ovum beds, date of, xv
 Upper Lias, see Lias, upper
 Upper Lias Cephalopoda Bed, 175
 Upper Lias Sands, 175
 Upton, Charles, 286, li, lxiii, cl, clxi, clxxix; prior use of Dumortieria, 286; his hints on photography, 380; and Dumortieria, clxix
 Uptonia, clxix, clxxxviii
 Vacek, Dr. M., 35, 53, 64, 83, 96, 155, 156, 176, 191, 238, 266, 269, 270, 273, 277, 294, 295, 297, 298, xxxvi; on Harp. opalinum, 54; on Lias and Oolite, 64; and Pseudographoceras sp., xciii
 Vacekia, Suppl., p. clvi; Stephensi
 Vacekia, from Pseudolioceras, clviii; classification, cxviii
 Valdani, Ammonites, 289
 variabile, Hammatoceras, 146
 variabile, Harpoceras, 146, 149, 211, vii, x, xxi, xxiii; remarks on discrepancies in Wright's figure of (by Mr. Crick), 146
 variabilis, Ammonites, 50, 153, 226, vii, x, xxiii, xxvii; Ammonites, as type of Haugia, 45; (jugosa), Ammonites, 212; beds, 164, 167; group, xxiii
 variabilis, Haugia, Pl. A, fig. 34; p. 146; Suppl., p. xxiii
 aff. variabilis, Haugia, Pl. 25, fig. 2; Suppl., p. xxiii; p. 146 (H. variabilis)
 variabilis, Haugia, Pl. 23, figs. 11, 12, see jugosa, H.; Pl. 23, figs. 14, 15, grandis, H.; Pl. 25, fig. 2, aff. variabilis, H.; p. 146, see spp. above
 variabilis, Haugia, 45, 142, x, xxi, xxiii, xxv, xxvi; and H. jugosa, comparative dimensions, 150; and Grammoceras dispansum, comparison of, 212; (hemera), ccv
 Variabilis hemera, vi, xii, xv, cliv; strata of, ccix; variabilis, Rhynchonella, 48
 Variabilis subzone, 45, 46, 50, 148
 variabilis, var. dispansus, Ammonites, 211
 Variation, normal and abnormal, 289
 Variation as specific and generic, excix
 Variety of form (pœcilomorphy), excix
 Vaughan, Dr., and Harpoceras nitescens, cxxxi; and Dumortieria, clxix; and Catullocceras Leesbergi, clxxi
 Vendée, cxxxiv, clxxxviii, clxxx

- Veneris, Parkinsonia, 272
 Ventral area, development of, 280, 299
 Ventrally inclined, 231
 Ventrally projected, 231
venustula, Canavarina, Pl. 31, figs. 5, 6, 10-12?, p. 179 (Grammoceras subserrodens): Suppl., Figs. 131, 132, p. clxvii; p. cxliii
 Vermiceras, 267; Conybearii
 Vernosæ, Catulloceras, 232, 233, 234; Dumortieria, 161, 234; Polymorphites, 264, 267, 276, 283, 284, 285; and Polymorphites, Haug's opinion on, 268
 Verpillière, see la Verpillière
 Versiradiate, x
 Versiradius, iii
 Versum, iii
 Versicostate (series Fontannesia), exci
vibrata, Ludwigella, Suppl., Pl. 19, figs. 13-15; p. lxxxviii
vitiosum, Cypholioceras, Suppl., Pl. 5, figs. 1, 2; p. xliv
 vittatum, Pleuroceras, 291
 Voltzii, Astarte, 5
 V-script genera, from Braunsella, cii
 V-script line, in earlier species, cvi
 V-scriptiradiate (series), xci
v-scriptum, Graphoceras, Pl. 10, figs. 5, 6; Pl. A, fig. 16; p. 68 (Lioceras concavum var. v-scriptum); Suppl., Pl. 15, fig. 18; Fig. 58 in text, p. xcvi
 v-scriptum, Lioceras, 69
 V-shaped radii, 57; ribbing, 124; ribs, 57, 69, 73, 75

 Waagen, Dr. W., 13, 14, 83, 91, 94, 96, 98, 151, 158, 272, 287, 292, 293, 328, 376, cxxii, exciv, excv; and Harpoceras, 13, 14, 143; on Gryphite grit, 91, 96
 Waagenia, 13, 313
 Wæhneroceras, 267
 Waldheimiæ, 52
 Walford, E. A., on Otley Hill, 40, 52; on Am. Murchisonæ, 53
 Walker, J. F., 94, xxxix, lxxv; and Walkeria, cxxxix
Walkeri, Hyperlioceras, Pl. 16, figs. 1, 2, see **Walkeri**, Toxolioceras; Pl. 16, figs. 3-6, **polita**, **Darellia**; Pl. 16, figs. 7-9, **piodes**, **Reynesella**; Pl. 16, figs. 10, 11, **cœla**, **Reynesia**; p. 92, see spp. above
Walkeri, Hyperlioceras, 301, civ, cix, cxiv, cxxvi
Walkeri, Toxolioceras, Pl. 16, figs. 1, 2, p. 92 (Hyperlioceras Walkeri); Suppl., Pl. 18, figs. 1-3, 22; p. cxxvi
Walkeria, Suppl., p. cxxxix; **arcuata**, **burtonensis**, **delicata**, **lotharingica**, sp., **subglabra**
 Walkeria, classification, excviii
 Walther, Dr. Johannes, criticisms of his dispersal theory, 454
 Welsch, Jules, and Welschia, li
Welschia, Suppl., p. li; **obtusiformis**, **pagana**, **rustica**
 Welschia, from Cosmogyrta, liii; from Hyattia, lv; from Kiliania, lxiv; from Ludwigia, lxix; from Brasilia, lxxx; classification, excviii
 Wentzen, 96
 Werthi, Ammonites, vii, xi, xxvii
 White bed below Ironshot, 293
 White Ironshot, Lower, date of, ccvii; Upper, date of, ccvii
 White Lackington, 175, 213, 219, 220, 231, 265, 281, xxv, cxlviii; section, 165
 White Oolite, 5
 White stone, date of, ccvi
 Whitehall Farm, xxviii
 Whittington, lxvi
 Whorl, contraction of, in age, 130
 Whorl-shape, excix; characters of, cc
 Whorl, see also leptogyral, oligogyral, pachygyral, platygyral, polygyral, stenogyral
 Whorls, relatively stout (series with), cxiv
 Wick, 305
 Wild Bed, xxxv; date of, ccvii
 Wilson, E., 278, 342, 399, xxvi, xxix, lv, lxxix, xcvi, c, cii, cix, cxiii, clxix, clxxxv; and Dundry, Ammonites, 63; and Ludwigia rudis, 103; sends specimens, 168, 173; gave figured specimen, 401; and Hyattia Wilsoni, lvi; see Buckman & Wilson
Wilsoni, Hyattia, Suppl., Pl. 12, figs. 4-9; p. lvi
 Wilton-shire, 359
 Wiltshire, Dr. T., and Wiltshireia, lxxviii
Wiltshireia, Suppl., p. lxxviii; **gigantea**
 Wiltshireia, from Lueya, lxxiv; from Ludwigia, lxix; classification, excviii
 Winwood, Rev. H. H., 165
 Wistley Hill, cxxi

- Witchell, E., 6, 42, 66, 78, 90, 91, 94, 100, 107;
on Stroud Hill, 6; on Little Sodbury, 40;
on sandy ferruginous limestones, 44; and
Witchellia, 82; on Gryphite-grit, 90, 94, 100;
and Brodieia Witchelli, xxxiii
- Witchell, Mrs. E., 66
- Witchelli, *Brodiceras*, Pl. 23, figs. 9, 10; p. 107
(*Ludwigia* sp.); p. xxxiii (*Brodieia*? *Wit-*
chelli)
- Witchelli, *Brodieia*, Pl. 23, figs. 9, 10, *Suppl.*, p.
xxxiii; see *Witchelli, Brodiceras*
- Witchellia, as new genus, 82; *Suppl.*, p. cxciii;
laeviuscula, sayni, sp., **sutneri*
- Witchellia, 117, 287, 290, 292, 314; and Dundry,
292, 293; from Dorsetensia, 303; characters
of, 303; from Sonnina, 314; beds, ccix
- Witchellia hemera, strata of, ccvi
- Witchellia sp. hemera, vi, ccv
- Wiltshireia, *Suppl.*, Pl. 11, fig. 31, misprint, see
Wiltshireia
- Woodward, H. B., 112, 446; on *Am. opalinus*, 50;
and use of double names, 222
- Worcestershire, clvi, clxi
- Wotton-under-Edge, 157, 173, 175, 182, 208, 213,
242, 247, 279, cxxxii, cl, clxxxii
- Wright, Dr. T., 35, 44, 49, 80, 114, 119, 146, 147,
148, 149, 150, 170, 172, 175, 176, 178, 182,
189, 192, 193, 197, 204, 205, 206, 207, 215,
232, 238, 254, 255, 287, 296, vii, viii, x, xvi,
xxi, xxiii, xxiv, xxxvi, xlii, xlv, lxxxix, cxxxi,
cxl, cxlv, cxlvii, cxlviii, cxlix, clii, cliii,
clxxxii, cc; on *Lias Ammonites*, 4, 6, 10, 37,
55; Frocester Hill, 3; on Leekhampton Hill,
7; *Harpoceras*, 11; on genus *Harpoceras*, 13;
on *A. Murchisonæ*, 19; on *Lioceras opalinum*,
22; on *Inferior Oolite*, 41, 42; on line between
Lias and *Oolite*, 44; on *Nautilus comptus*, 53;
on *Am. concavus*, d'Orb., 60, 86; on *Gryphite-*
grit, 91; on *A. bifrons* in *Cotteswold Sands*,
113; on *A. variabilis*, 143; on *A. dispansus*,
145; and *opalinum-zone*, 220; and *Harp.*
aalense, 256; and specimen of *Ludwigella*
glevensis, lxxxix; and *Harpoceras radians*,
cxlv; remarks on *A. Moorei*, clxxxii
- *Wrighti, *Lytoceras*, nom. nov., 44
- Wrighti, *Lytoceras*, 45, cc; *Sphaeroceras*, 120
- Würtenberger, 272
- Württenbergeri, *Ammonites*, 85
- Wyke Quarry, 62, 120. lxxxv; section at, 8
- Yate, 40
- Yellow Sands, xxxv; date of, ccviii; at Midford,
position of, 113
- Yellow and blue sands, date of, ccviii
- Yellow and grey sands, 167, 229; beds of, 168;
below Dogger, date of, ccviii
- Yellow micaceous sands, 167
- Yeovil, 6, 52, 97, 106, 237, xxxviii, clxxii, clxix,
clxxiv; absence of *Opalinum* beds, 52; mis-
taken use of the name in labelling fossils, 106;
and Ilminster, lxxxvi; strata of, ccviii
- Yeovil Junction, 245, clxxviii; strata at, 6; may
denote specimens from Dorset and Somerset,
247
- Yeovil Sands, 3, 47, 166; characters of, fossils
of, 6; doubts about correlation with *Cottes-*
wold Sands, 50; and *Cotteswold*, discrepancy
of *Am. fauna* in, 52; base, 165; beds of, 166,
168; date of, ccviii, ccix
- yeovilensis, *Dumortieria*, Pl. 37, figs. 16, 17, p.
243 (*D. striatulo-costata*); *Suppl.*, Fig. 172,
p. cxcvi; p. clxxviii
- Yorkshire, 86, 173, 175, 188, 202, 228, 239, xc;
Dogger, 167; strata, 167; yellow and grey
sands, 167; sands on horizon of *Dumortieria*
beds, 167; strata of, ccviii, ccix
- Young & Bird, 38, clviii
- Zieten, 17, 35, 169, 188, 192, 197, 215, 216, 227,
241, 252, 254, xl, lv, clxxxii
- Zigzag beds, ccvi
- Zigzag hemera, vi; strata of, ccvi
- zigzag, *Stephanoceras*, possible descendants of,
272; characters of adult of, 272
- zigzag, *Zigzagiceras*, hemera, ccv
- Zio, *Harpoceras*, 13
- ziphus, *Ammonites*, 289; unispinous stage, sepa-
rating progressive and retrogressive costate
stages, 290
- Zittel, Dr. K. A., 268, 269, 287; classification,
126; on *Harpoceras*, 128; and *Oxynoticeras*,
225
- Zitteli, *Harpoceras*, 158; *Polymorphites*, 266, 267,
268, 270, 276, 282, 284, 285
- Zoological series, development, cxcix

Zonal Ammonites mixed, 7

Zone, erroneous ideas concerning species in a, 446 ;
 species of a, not necessarily contemporaneous ;
 immense time to deposit, 446 ; commune,
 bifrons, concavum, falciferum, Harpoceras,
 henleyi, humphriesianum, ibex, jamesoni,
 jurensis (e), margaritatus, murchisonæ, opa-
 linum (us), parkinsoni, Posidonomya Bronni,
 sauzei, sowerbyi, spinatum, Stephanoceras,
 Stephanoceratites, Trigonina navis, torulosus

Zones, and sub-zones, 2 ; Oppel, 49 ; and beds, 166 ;
 coalesced, 274

Zurcher and Zurcheria, 293

Zurcheri, Sonninia, and Fontannesia, cxc

Zurcheria, p. 293 ; Suppl., p. cxc ; *inconstans*,
parvispinata, *pertinax*, *pugnax*, **ubaldi*

Zurcheria, 287, 314, 436, cci ; Foreign species of,
 described, 298 ; from Haplopleuroceras, 300 ;
 from Sonninia, 314 ; classification, cxviii



With the

THE
PALÆONTOGRAPHICAL SOCIETY.

INSTITUTED MDCCCXLVII.

VOLUME FOR 1898.

L O N D O N :

MDCCCXCVIII.



A MONOGRAPH

ON THE

INFERIOR OOLITE AMMONITES

OF

THE BRITISH ISLANDS.

BY

S. S. BUCKMAN, F.G.S.,

HONORARY MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY; HONORARY SECRETARY OF THE COTTESWOLD
NATURALISTS' FIELD CLUB, ETC.

PART X.

SUPPLEMENT:

I.—REVISION OF, AND ADDITION TO, THE HILDOCERATIDÆ.

PAGES i—xxxii; PLATES I—IV.

LONDON:

PRINTED FOR THE PALEONTOGRAPHICAL SOCIETY.

1898.

PRINTED BY ADLARD AND SON,
BARTHOLOMEW CLOSE, E.C., AND 20, HANOVER SQUARE, W.

INFERIOR OOLITE AMMONITES:

SUPPLEMENT:

I. REVISION OF, AND ADDITION TO, THE HILDOCERATIDÆ.

A THOROUGH revision of the genera and species belonging to the family Hildoceratidæ is imperative, for two reasons:—(1) because of the large accumulation of material, with so many new forms; (2) because the knowledge concerning the affinities of different species has necessarily become more complete. This revision will form the main object of the present Supplement.

The great difficulty in connection with the Hildoceratidæ is the occurrence of many series of specimens with a remarkable similarity of shape. So long as such a feature was regarded as of supreme importance, and due consideration was not given to other characters, because their significance was misunderstood, so long was the classification of the Hildoceratidæ incorrect and unsatisfactory.

Outward form is of merely subordinate value in classification. It is obvious that species most dissimilar in mere shape can produce, by modification, specimens which are very similar. Hence some other criteria of affinity must be sought for; and they are to be found in the characters of the ornamentation and suture-lines of the species. In comparison with the mere shape both these features are constant. They are modifiable and they are modified; but they change so much more gradually than does the mere shape of the conch that they may, for practical purposes, be regarded as fairly stable. At any rate, they change so slowly that their identity is preserved.

In regard to the suture-line and the character of the ornamentation as criteria of affinity, it must be acknowledged that the former undoubtedly holds premier position. But there are many practical reasons why it cannot always be used as efficiently as it deserves. And when, as in the Hildoceratidæ, the ornamentation

is found to give a criterion with so much diversity of character, it may well, until knowledge of the family be more complete, be utilised, with the suture-line, as a basis for a classification.

By the term ornament it is not intended to imply merely the production of costæ and tubercles. They practically indicate stages of phyletic development, and no more. It is not the kind, but the manner of ornament which has to be considered, namely, the disposition of the growth-lines, for in these cases the ornament is parallel therewith. The disposition of the ornament, then, is found to have very remarkable variation in the Hildoceratidæ; and, as this disposition is the same as the growth-lines, which were the results of the two processes of deposition and absorption on the part of the mantle during the growth of the specimen, it must indicate certain anatomical differences on the part of the various species.

Therefore in the Hildoceratidæ the disposition of the ornament, or, what is the same thing, of the growth-lines, is considered to be of particular importance. At any rate, it is regarded as a test of generic affinity. This disposition of the ornament is used in illustration, and referred to as the radial line or curve.¹

Such are the reasons for, and the methods of the revision. No one regrets more than the author of this work that the revision will mean the alteration of many names, involving the disturbance of what appeared to be settled. But it cannot be helped. It may be said with Cicero, *Errorem creat similitudo*; and what may be called the deceptions of homœomorphy are only being gradually learnt. I confess that they have misled me. It is no excuse if I have been deceived in good company. But I recognise some of the incorrectness of my own work. I would attempt to alter this, and to place the whole on a surer basis, hopeful that I am wiser to-day than I was yesterday.

In order to carry out the revision with conciseness, and to deal with an immense mass of detail, it becomes very necessary to introduce certain definite technical terms. Some of them have been already employed in earlier portions of this work; but the following notes are intended to save the labour of reference in regard to the old, and to explain the meanings of the new terms.

Shape of Whorls.—Concise terms to express the differences of whorl-shape are required. Some of the following terms are already used in connection with Gastropoda, and so I have extended them to make a congruous series.

An Ammonite may reach a given diameter by making several narrow, or a few broad whorls. In the first case, in reference to the number of whorls, it would be *polygyral*; in the second, *oligogyral*; while in reference to the breadth of the whorls—from inner margin to periphery—it would be *stenogyral*, narrow-

¹ The radial curve and the suture-line both demand consideration. In certain cases there is an identical form of radial curve, but a marked difference in suture-line. There are some striking cases of this deceptive homœomorphy.

whorled, or *platygyral*, broad-whorled. Then there is the other dimension of the whorl to be considered—from side to side. If the Ammonite has thick whorls it is *pachygyral*; if thin compressed whorls it is *leptogyral*.

Radius.—This is the comprehensive term for the ornament which is parallel with the growth-lines. It gives no qualification as to its direction, size, shape, &c.

Direction of Radius.—This has to be considered under two headings:

1. The radius is straight or curved on the lateral area. In the first place it is a *rectiradius*, and the specimen is *rectiradiate*; in the second, a *flexiradius*.

2. The *recti-* or *flexiradius* has a general direction across the whorl in regard to a straight line drawn from the centre of the Ammonite through the inner end of the radius: (a) it either falls behind that line on its way to the periphery,—it is then a *rursiradius*, and the specimen is *rursiradiate*; (b) it has, in its general direction, the same course as the line,—it is then a *versiradius*; (c) it tends forwards of the line,—it is then a *prorsiradius*, and the specimen is *prorsiradiate*.¹ When the radius is so disposed as to be a combination of *prorsi-* and *rursiradius*, forming a >, the apex pointing towards the aperture of the conch, it may be called an *anguliradius*, and the specimen would be *anguliradiate*.

It is convenient to have similar terms in connection with the manner in which the radius crosses the periphery. As the radial curve is drawn in comparison with a straight line from the centre to the position attained by the radius on the medial line of the periphery, it makes much difference whether the specimen be peripherally *anguliradiate* or *rectiradiate*.

Stria.—This describes the radius when it is like any slightly raised line.

Costa.—This signifies a coarser ornamentation in the form of a ridge. According to the size of its costæ a specimen may be *parvicostate* or *crassicostate*; according to the number, *paucicostate* or *densicostate*.

When the radius is part costa and part stria the terms may be *strii-costa* or *costi-stria*, commencing from the inner margin.

Tuberculation.—A raising of the test, more restricted than a costa, forms a *tubercle*—as a general term. A conical elevation is a *spina*; an obtuse elevation, more or less laterally compressed, a *bulla*;² a round knob, a *nodus*; a small pimple-like elevation, a *papilla*.

In certain cases the tubercle is partitioned off by a layer of test at the base.³ In other cases it is not, and the interior must have been occupied by the

¹ *Rursum*, backwards; *versum*, turned in the direction of; *prorsum*, forwards.

² In the cases under consideration the long axis of the bulla is across the whorl parallel with the radius. To meet other cases further nomenclature will be required. It is obvious that these terms are not sufficient.

³ In *Deroceras* (*Am. armatus* group): when the test is lost there are no tubercles on the core, but only plate-like areas.

mantle.¹ In the former case the specimen is *septituberculate*; in the latter *non-septituberculate*, or, more simply, *tuberculate*.

Ornamentation.—The greater or less elaboration of the ornament (*costæ* and tubercles) upon the conch may be stated in the following terms: *crassornate*, *ornate*, *subornate*; when there is no ornament, *lævigata*.

Regulari- and Irregulari-ornate.—The ornament is irregular if it varies considerably in size, or is not uniform in its development. When the irregularity consists merely of occasional variation in size, a more particular term may be *inæqui-ornate*. Similar qualifying terms may be used in connection with the particular details of the ornament.

Periphery.—In order to describe all the different aspects of the periphery an elaborate scheme of nomenclature would be required. That would be out of place here, but the following terms are necessary.

The periphery may be *planate*, *convex*, or *concave*; when the concavity is rather restricted the periphery is *sulcate*; if furnished with a carina it may be *carinati-convex* or *carinati-sulcate*;² when somewhat like the roof of a house sloping into a more or less definite edge, it is *fastigate*. Its sloping sides may be slightly convex, flat (truly fastigate), or slightly concave, when the following modificatory definitions are necessary: *convexi-*, *plani-*, and *concavi-fastigate*. A narrow flat periphery is *tabulate*; divided by a carina it is *carinati-tabulate*, which is perhaps better than *bitabulate*.

Carina.—The different developments of the peripheral carina may be distinguished as *alticarina*, *carina*, *parvicarina*. The carina is sometimes partitioned off by a septum, when it has been called a hollow carina (*vide* p. 81); when not so parted it has been designated a solid carina. The terms are not exact, and may be replaced by *septicarina* and *non-septicarina*. In most cases an *alticarina* is a *septicarina*, but not always,—for instance, *Hyperlioceras*.

The *umbilicus* requires many technical terms, but the following may suffice for the present.

Gradumbilicate.—A portion of each inner whorl is exposed, making the umbilicus in the form of steps, or like an amphitheatre.

Concavumbilicate.—A small bowl-shaped umbilicus, so noticeable in the *Ammonites concavus*, Sow. The lower edge of the inner margin of the overlapping whorl is superposed on the upper edge of its predecessor, and as the inner margin has more or less of a slope, the result is in some cases a regularly concave umbilicus like a small bowl. When the superposition is not quite exact,

¹ In *Sonninia*, in *Stephoceras* (= *Stephanoceras*, i. e. *Humphriesianum* group), &c.: when the test is lost the core is still tuberculate.

² Formerly *carinate-bisulcate*, but it is really one furrow divided by a carina.

but a small portion of the side of the whorl is shown, it may be called *sub-concavumbilicate*; when more of the preceding whorl is exhibited, the conch would be *gradumbilicate*.

Craterumbilicate, having a deep basin-shaped umbilicus like that of *Ammonites Blagdeni*.

Latumbilicate, with a wide umbilicus.

Angustumbilicate, with a narrow umbilicus.

Concentrumbilicate, having an umbilicus in which the whorls coil regularly around the central axis at a gradually increasing distance.

Excentrumbilicate, having an umbilicus in which the whorls do not coil regularly around a central axis. The umbilicus shows a more or less sudden expansion after a certain period.

Particular attention should be given to whether a species is *excentri-* or *concentri-latumbilicate*. Frequently a species may be *angustumbilicate* in youth, but may become *excentrilatumbilicate* in the adult state.

The Septa.—The following terms in connection therewith are required for the sake of brevity in definition.

Densiseptate, a specimen with septa close together.

Pauciseptate, when the septa are distant.

Ornatilobate, when the septum is considerably branched, so as to form a complex suture-line.

Inornatilobate, when the septum is not much branched.

By the use of these technical terms the descriptions will be rendered much more concise, and the comparison of species will be facilitated.

Chronology.—One other matter yet remains, and that is how to indicate the sequential occurrence of the different species. In this Supplement the chronological system will be adopted; and each species will be dated, as regards the time of its existence, by means of the chronological unit, the term *hemera*.¹

For the purposes of this Monograph the term “Inferior Oolite” has been considered to embrace the deposits from the base of the Cotteswold Sands of Frocester Hill to the top of the limestone beds of Broad Windsor, inclusive. The time which it took to deposit these and all their intervening strata is now divided into twenty-three hemeræ, whereby it is possible to express the date and sequence of species with considerable and very necessary exactitude. The list of these hemeræ, named after their principal Ammonites, is as follows:

¹ “The Bajocian of the Sherborne District,” ‘Quart. Journ. Geol. Soc.’ vol. xlix, p. 481.

HEMERÆ:	<i>Witchelliæ</i> sp.	<i>Aalensis</i> .
<i>Fuscæ.</i>	<i>Sonniniæ</i> sp.	<i>Moorei</i> .
<i>Zigzag</i> . ¹	<i>Discitæ.</i>	<i>Dumortieriæ</i> sp.
<i>Truelli</i> . ¹	<i>Concavi.</i>	<i>Dispani</i> .
<i>Garantianæ.</i>	<i>Bradfordensis.</i>	<i>Struckmanni</i> .
<i>Niortensis.</i>	<i>Murchisonæ.</i>	<i>Striatuli</i> .
<i>Blagdeni</i> .	<i>Seissi.</i>	<i>Variabilis</i> .
<i>Sauzei</i> .	<i>Opaliniformis.</i>	<i>Lilli</i> .

Of these Hemeræ so many form an Age, but that portion of the subject does not require consideration here.¹

Family—HILDOCERATIDÆ.

The *Lillia*-*Haugia* series.

At present a considerable series of species, to which certain titles have been somewhat indiscriminately applied, are arranged under the two genera *Lillia* and *Haugia*. The method of such generic distribution and its consequent nomenclature is more influenced by shape than by questions of exact genetic affinity. It is somewhat as follows:

Haugia, platyleptogyral, somewhat angustumbilicate, more or less alticarinate species.

Lillia, stenogyral, latumbilicate, peripherally carinati-sulcate species.

However, such characters belong to stages of phylogenetic development,—that is to say, the biologically later *Lilliæ* would possess characters ascribed to “*Haugia*,” the biologically earlier *Haugiæ* the characters given to “*Lillia*.” Such characters, therefore, can only be taken relatively to other features, as to what degree they are developed in proportion to the development of those other features.

The following is a list of the principal species which belong to the *Lillia*-*Haugia* series, or are sufficiently similar to require consideration:

ANDIUM, HARPOCERAS, *Gottsche*, Pl. i, fig. 8.

BAYANI, AMMONITES, *Dumortier*, Pl. xvi, figs. 7—9.

¹ Buckman and Wilson, “Dundry Hill,” ‘Quart. Journ. Geol. Soc.’ vol. lii, p. 669; and Table IV, &c., 1896. Also Buckman, ‘Jurassic Time,’ *ibid.*, vol. liv, p. 442.

- COMENSIS, AMMONITES, *von Buch*, Pl. ii, figs. 1—3.
 — — — *Dumortier*, Pl. xx, figs. 1, 2.
 — — — *Hauer*, Pl. xi, figs. 1—8.
 — — — *Meneghini*, Pl. v; Pl. vi, figs. 1—3; Pl. vii, figs. 1—5; Pl. viii, figs. 5—7; Pl. xii, fig. 1.
- ERBAENSIS, AMMONITES, *Dumortier*, Pl. xxiii.
 — — — *Hauer*, Pl. xi, figs. 10—14.
 — — — *Reynès*, Aveyron., Pl. v, fig. 5.
 — — — — Monogr., Pl. vi, figs. 1—11.
- ESCHERI, AMMONITES, *Dumortier*, Pl. xix, fig. 7.
 — — — *Hauer*, Pl. x, figs. 1—3.
- ESERI, AMMONITES, *Oppel*, Pal. Mitth., pl. xlv, fig. 3.
- ILLUSTRIS, AMMONITES, *Denckmann*, Pl. v, fig. 2; Pl. vi, fig. 1.
- JUGOSUS, AMMONITES, *Sowerby*, Pl. xcii, fig. 1.
- LILLI, LILLIA, *Bayle*, Pl. lxxxii, fig. 1.
 — AMMONITES, *Dumortier*, Pl. xxi.
 — — — *Hauer*, Pl. viii, figs. 1—3.
 — — — *Reynès*, Monogr., Pl. v, figs. 31, 32.
- LYTHENSIS, AMMONITES, cf. *Quenstedt*, Amm. Schwäb. Jura, pl. liii, fig. 14.
- MALAGMA, AMMONITES, *Dumortier*, Pl. xxii, figs. 1—4.
- NAVIS, AMMONITES, *Denckmann*, Pl. vi, fig. 4.
 — — — *Dumortier*, Pl. xx, figs. 3—6.
- OGERIENI, AMMONITES, *Denckmann*, Pl. v, fig. 1.
 — — — *Dumortier*, Pl. xix, figs. 3—5.
- RADIANS COMPRESSUS, AMMONITES, *Quenstedt*, Ceph., pl. vii, fig. 9.
 — — — — — Jura, pl. xl, fig. 13.
 — — — — — Amm. Schwäb., pl. li, figs. 6—8.
 — GIGAS, AMMONITES, *Quenstedt*, Ibid., pl. li, figs. 2, 3.
- RHEUMATISANS, AMMONITES, *Dumortier*, Pl. xxv.
- ROBUSTUS, AMMONITES, *Denckmann*, Pl. vii, fig. 1.
- TIROLENSIS, AMMONITES, *Dumortier*, Pl. xxiv.
 — — — *Hauer*, Pl. vii, figs. 1—3.
- VARIABLE, HARPOCERAS aff., *Gottsche*, Pl. i, fig. 9.
 — — — *Quenstedt*, Amm. Schwäb., pl. lii, figs. 11—13. A doubt may be expressed whether the specimens shown in figs. 12, 13 do belong to the *Lillia-Haugia* group at all.
 — — — *Wright*, Pl. lxvii, figs. 1, 2, 5, 6; Pl. lxviii.
- VARIABILIS, AMMONITES, *Chapuis et Dewalque*, Pl. ix, fig. 2.
 — — — *Denckmann*, Pl. v, fig. 3.
 — — — *d'Orbigny*, Pl. cxiii.
- WERTHI, AMMONITES, *Denckmann*, Pl. ii, fig. 1.

The following is a list of the works wherein they are figured :

- BAYLE, Explic. Carte géol. de la France, vol. iv, pt. 1, 1878.
 BUCH, Pétrif. remarq., 1831.
 CHAPUIS ET DEWALQUE, Foss. Luxembourg, Mém. cour. et Mém. des Savants étrang., tom. xxv, 1853.

- DENCKMANN, Fauna von Doernten; Geol. Specialkarte von Preussen und den Thüringischen Staaten, Bd. viii, Heft 2, 1887.
- DUMORTIER, Études pal. Bassin du Rhône, vol. iv, 1874.
- GOTTSCHKE, Jurass. Verstein.; Palæont., Suppl. 3, Lief ii, Heft 2, 1878.
- HAUER, Ceph. N. O. Alpen; Denksch. math.-natur. Wissensch., Bd. xi, 1856.
- HAUG, Nouv. Amm.; Bull. Soc. Géol. France, 3e sér., 1884.
- MENEGHINI, Lias supérieur; Pal. Lombarde, series 4, 1867.
- OPPEL, Jurass Ceph.; Pal. Mittheilungen, 1862.
- ORBIGNY, Ceph. Terr. Jurass.; Pal. franç., 1844.
- QUENSTEDT, Cephalopoden, 1846.
- Jura, 1858.
- Amm. Schwäb. Jura, 1885.
- REYNÈS, Géol. et Pal. Aveyronnaises, 1868.
- Monogr. Amm., Lias sup., 1879.
- SOWERBY, Mineral Conchology, 1815.
- WRIGHT, Lias Ammonites, Pal. Soc., 1882.

These species of the *Lillia-Haugia* series may be arranged according to the different characters which they possess. Thus at least five different characters may be utilised for the purpose of a rough analysis. So a species is either—

Latumbilicate	}	Rectiradiate	}	Rursiradiate	}	Crassornate	}	Regulari-ornate
or		or		or		or		or
Angustumbilicate ¹	}	Flexiradiate		Versiradiate	}	ornate	}	irregulari-ornate
				or		or		
				Prorsiradiate		parviornate		

—and there are further characters of distinction.

A rough classification of the different species of the *Lillia-Haugia* series is now attempted. It is attended with very considerable difficulty. In the first place, it has not hitherto been considered necessary to figure the radial curve, and so a most important character is wanting. Then there is a mechanical difficulty: it is impossible to place side by side the figures of species contained in a number of large volumes; so that comparison is rendered extremely laborious, and at best it is unsatisfactory. It is only possible to carry out the arrangement of the species in a natural order by having figures of all specimens mounted on separate slips, in order that they can be brought together in series in a small compass. But this can only be accomplished either by re-drawing all the figures, or by cutting up the plates of costly volumes; and both these processes are out of the question at present. But one or the other will have to be adopted if an exact classification is to be obtained.

However, the result of the comparison which I have instituted between the various species, and the analysis of their characters, is now presented.

¹ These terms are used comparatively with regard to species nearly in the same developmental stage,—for instance, to express the distinction between the umbilication of *Lilli* and *Bayani*, both costate species with the carinati-sulcate periphery retained.

CLASSIFICATION OF THE SPECIES OF THE *LILLIA-HAUGIA*
SERIES.

I. Latumbilicate¹ (pachygyral).

A. Rectiradiate.

A. Subornate—*Lillia*, *Chartronia*.

α. Subtuberculate—*Lillia*.

1. Subpaucicostate.

AM. LILLI, *Hauer*, = LILLIA LILLI.

2. Subdensicostate.

AM. LILLI, *Dumortier*, = LILLIA NARBONENSIS.

LILLIA LILLI, *Bayle*.

β. Bituberculate—*Chartronia*, g. n.

CHARTRONIA BINODATA, sp. n.

B. Crassornate—*Denckmannia*, g. n.

α. Rursiradiate.

1. Crassicostate, tuberculate.

AM. ERBAENSIS, *Dum.* (non *Hauer*), = D. ISERENSIS (*Oppel*).

AM. ERBAENSIS, *Reynés*, Aveyron, Pl. v, fig. 5.

2. Subcrassicostate, paucituberculate.

AM. ERBAENSIS, *Hauer*.

AM. ERBAENSIS, *Reynés*, Monogr., L. Sup., Pl. vi, figs. 7, 10.

β. Versiradiate.

D. TUMEFACIA, sp. n.

AM. ERBAENSIS, *Reynés*, Monogr., L. Sup., Pl. vi, fig. 5.

AM. NAVIS, *Denckmann*, Pl. vi, fig. 4.

D. TORQUATA, sp. n.

¹ In comparison to development.

INFERIOR OOLITE AMMONITES.

 γ . Bursi-subflexiradiate.AM. ROBUSTUS, *Denckmann*.AM. MALAGMA, *Dumortier*.HARP. VARIABILE, *Wright*, Pl. lxviii, = D. ASPERA.AM. cf. OGERIENI, *Denckmann*, Pl. v, fig. 1.

D. OBTECTA, sp. n.

C. *Inæquiornate* = " *Podagrosi* " (pars). α . Tuberculation inconspicuous.AM. RHEUMATISANS, *Dumortier*. β . Tuberculation more conspicuous.AM. COMENSIS, *Meneghini*, Pl. vi, fig. 3.D. *Subcrassornate*—*Haugia*. α . Subrursiradiate, subirregulari-ornate.AMMONITES sp. ind., *Denckmann*, Pl. vi, fig. 6.AM. NAVIS, *Dumortier*. β . Subrursiradiate, regulari-ornate.1. *Tuberculate stage long*.AM. COMENSIS, *Meneghini*, Pl. vi, fig. 1.HAMMATOCERAS OGERIENI, *Bayle*.AM. VARIABILIS, *d'Orb*, Pl. cxiii, figs. 3, 4.

HAUGIA VARIABILIS, This Monogr., Pl. xxv, fig. 2, = HAUGIA aff. VARIABILIS.

HARPOCERAS VARIABILE, *Wright*, Pl. lxvii, figs. 1, 2, = HAUGIA sp.2. *Tuberculate stage short*.AM. TIROLENSIS, *Hauer*. γ . Versiradiate.1. *Umbilicate*.AM. VARIABILIS, *d'Orb*, Pl. cxiii, figs. 1, 2. Type = HAUGIA VARIABILIS.HARPOCERAS VARIABILE, *Wright*, Pl. lxvii, figs. 5, 6, = HAUGIA VARIABILIS ?AM. OGERIENI, *Dum.*, Pl. xix, fig. 5. Type = HAUGIA OGERIENI.

HAUGIA JUGOSA, This Monogr., Pl. xxiv, = HAUGIA GRANDIS.

HAUGIA PATELLIFORMIS, sp. n.

2. *Less umbilicate.*AM. JUGOSUS, *Sowerby*.AM. OGERIENI, *Dumortier*, Pl. xix, figs. 3, 4.HAUGIA JUGOSA (VARIABILIS), *This Monogr*, Pl. xxiii, figs. 11—13.

The following species show a slight amount of flexure in the costation, and this character seems to distinguish them. They may be placed here for convenience, but it is possible that they are more connected with *Phymatoceras*.

AM. ILLUSTRIS, *Denckmann*, Pl. vi, fig. 1, (Type).AM. ILLUSTRIS, *Denckmann*, Pl. v, fig. 2.

HAUGIA ? COMPRESSA, sp. n.

Some of the species of the *Eseri*-group show flexure too. They are perhaps descendants of different genetic series, possibly of *Lillia*, possibly of *Phymatoceras*. But that matter being uncertain they may be placed here to avoid change of name.

B. *Flexiradiate—Phymatoceras*, Hyatt.A. *Tuberculation irregular.*AM. TIROLENSIS, *Dumortier*, (Type of genus).AM. COMENSIS, *Meneghini*, Pl. viii, fig. 6.B. *Tuberculation subregular.*AM. ESCHERI, *Hauer*.AM. COMENSIS, *Meneghini*, Pl. viii, fig. 7.HAUGIA DUMORTIERI, *S. Buckman*.C. *Tuberculation inconspicuous.*AM. COMENSIS, *Meneghini*, Pl. v.AM. COMENSIS, *von Buch*.AM. COMENSIS, *Dumortier*, Pl. xx, figs. 1, 2.AM. WERTHI, *Denckmann*, Pl. ii, fig. 1.

PH. ? PAUPER, sp. n.

II. Angustumbilicate (pachygyral)—*Brodieia*.

A. Septicarinate? carinati-sulcate.

A. *Rectiradiate*.

AM. COMENSIS, *Hauer*, Pl. xi, figs. 1, 2.

AM. BAYANI, *Dumortier*.

AM. COMENSIS, *Meneghini*, Pl. vii, figs. 2, 3, two species.

AM. COMENSIS, *Meneghini*, Pl. xii, fig. 1.

BRODIEIA JUNCTA, sp. n.

B. *Subflexiradiate*.

AM. COMENSIS, *Meneghini*, Pl. vii, fig. 1.

AM. COMENSIS, *Hauer*, Pl. xi, figs. 4, 5.

B. Non-septicarinate (periphery not bisulcate).

A. *Non-tuberculate, platygyral*.

INCERTÆ SEDIS; This Monogr., Pl. xii, figs. 35, 36, = BRODIEIA CURVA.

B. *Tuberculate, stenogyral*.

AM. ESCHERI, *Dumortier*.

LUDWIGIA sp., This Monogr., Pl. xxiii, figs. 9, 10, = BRODIEIA (?)
WITCHELLI.

From the foregoing grouping it will be seen that there are several distinct genetic series to be dealt with. But as the series is obviously very incomplete, the application of generic names must be for the present somewhat arbitrary.

Geological Position.—The bulk of the species of the *Lillia-Haugia* series mark a very definite portion of geological time. The following table will show this :

Hemerae.	Palæontological phenomena.	Geological phenomena in the Cotteswolds.
<i>Striatuli</i> . .	<i>Grammoceras striatulum</i> dominant.	Ironshot limestone, base of Cephalopod-bed.
<i>Variabilis</i> . .	Non-tuberculate species like <i>Eseri</i> . Platygyral forms like <i>Haugia jugosa</i> .	Upper part of Cotteswold sands.
<i>Lilli</i> . .	Stenogyral forms like <i>Lilli</i> . Leptogyral forms allied to <i>Hild. bifrons</i> .	Lower part of Cotteswold sands.
<i>Bifrontis</i> . .	<i>Hildoceras bifrons</i> in its prime.	So-called Upper Lias clay.

The species like *Lilli* are only sparingly found in this country; and in some cases the containing deposits are so thin that the faunal sequence is made out with difficulty. In the Cotteswolds, where there is some thickness of deposit, they do not occur; but contemporaneity is established by their companion, the leptogyral, subangust-umbilicate development of *Hildoceras bifrons*.¹

The forms like *Lilli* seem to belong to the Mediterranean borders and the Rhone basin. It would be interesting to know if their position in those places corresponds to that set forth in the above table.

Family—HILDOCERATIDÆ.

I. Genus—LILLIA, Bayle.

1889. LILLIA. This Monograph, p. 108 (pars).

Definition.—Stenogyral, latumbilicate, nodate, subrursi-recticostate, septi-carinate, subpauciseptate, inornatilobate.

Remarks.—The nodi when present are situated near the edge of the inner margin of the whorl. They are not strongly developed, and they disappear in the gerontic stage while the costæ are still present.

Correction.—The solid carina described at p. 108 was an error partly due to incorrect drawings in the works of certain authors, partly to a wrong identification of "*sulcata*" as a *Lillia*. The carina is evidently hollow, as may be seen in Supplement, Pl. I, fig. 2, where a portion of the preserved infilling is shown.

History.—The title *Lillia* was given by Bayle to an Ammonite which he called "*Lillia Lilli* (Hauer);"² but it is not Hauer's species. Subsequently it was used by Haug for the groups of *A. comensis*, von Buch, and *A. Mercati*, Hauer.³ Later it was employed by myself as title for a genus, with *A. comensis* for the type.

More critical consideration of generic characters makes it doubtful if such an interpretation was justified. It seems probable that the *Mercati*-group has nothing to do with the *Lillia*-*Haugia* series; while the *comensis*-group, so far as may be judged from von Buch's not very satisfactory figure, appears to be easily separable from Bayle's *Lilli* by possessing the character of flexed ribs.

Therefore it appears desirable to take as the type-form of *Lillia* the species which Bayle figured as *Lillia Lilli*, though it is not Hauer's species, as it is more densicostate.

¹ Cf. this Monograph, Pl. III, figs. 20, 21.

² Op. cit. p. XXX, fig. 1.

³ Beitr. Monogr. Hart. Neues Jahrb. Mineral., Vol. 10, p. 487.

Correction.—In the explanation of Pl. XXII, figs. 32, 33, and Pl. XXIII, fig. 1, erase the word *Lillia*. The species does not belong to the Hildoceratidæ, but to the Sonnininæ, a sub-family of the Amaltheidæ. Haug has more correctly called the species *Sonninia sulcata*; ¹ but its removal from *Sonninia* will become necessary. Consequently make the necessary corrections in the text at p. 109.

1. *LILLIA LILLI*, *Hauer*. Suppl., Plate 1, figs. 1—6.

1856. AMMONITES *LILLI*, *Hauer*, Pl. viii, figs. 1—3.

(Non *Am. Lilli*, Dumortier; non *Lillia Lilli*, Bayle.)

Description.—Stenogyral, latumbilicate, subornate, nodate, sparsi-subrursi-recticostate, septicarinate, subpauciseptate, inornatilobate.

Remarks.—The rursicostate character is shown in Hauer's figure with so much want of uniformity as to suggest a possible incorrectness on the part of the artist. If, however, the character does exist as delineated, then our specimen does not agree with Hauer's in this respect, for it is only subrursicostate, in which case it may be wrong to give it the name of *Lilli*.

Localities and Stratum.—Somerset: Shepton Beauchamp; and Trent, near Yeovil, "Upper Lias" (in close connection with *Hildoceras bifrons*).

Date of Existence.—*Lilli* hemera.

2. *LILLIA NARBONENSIS*, *S. Buckman*. Suppl., Plate II, figs. 3, 4.

1874. AMMONITES *LILLI*, *Dumortier* (non *Hauer*), Pt. 4, pl. xxi.

Description.—Stenogyral, latumbilicate, subornate, nodate, subdensi-subrursi-recticostate, septicarinate (?).

Remarks.—The description is drawn up from Dumortier's figure. It may be presumed by analogy with other species that this one is septicarinate, and that the representation of the carina in Dumortier's figure is incorrect, the remains of the infilling being drawn as a complete carina.

The name *narbonensis* is taken from the appellation of the Roman province in which Dumortier's specimens were obtained.

¹ "Études sur les Ammonites des étages moyens du système jurassique," 'Bull. Soc. Géol. France,' 3e sér., pl. xx, p. 290, 1893.

History.—The *A. Lilli* of Dumortier differs from the *A. Lilli*, Hauer, in being less umbilicate, more numerous costate, less tuberculate, and having more elliptical whorls. It therefore requires a new name.

A rough fragment found by Mr. B. Thompson, F.G.S., was sent to me a few years ago for identification. I pointed out that it agreed with the *A. Lilli*, Dumortier (non Hauer), and Mr. Thompson quoted it on my authority in his paper on "The *Jurensis*-zone in Northamptonshire" ('*Journal Northants N. H. Soc.*,' 1890). The fragment, however, is not good enough to found a species upon. Therefore Dumortier's figure is taken as the type of *Lillia narbonensis*; and this specimen is considered to agree with Dumortier's figure. His drawing represents the rursicostate character as more marked than in the present fragment; but the representation of this character is not uniform, and it has perhaps been exaggerated in places. Also difference in age may have something to do with it.

Distinction.—The more numerous costæ sufficiently separate this species from *Lillia Lilli*.

Locality and Stratum.—Northamptonshire: Moulton (Upper *Leda-ovum*-beds,¹ "Upper Lias"), Mr. B. Thompson, F.G.S.

Date of Existence.—*Lilli* hemera.

¹ Mr. Thompson claims "the Upper *Leda-ovum*-beds" as *Jurensis* zone, and "that [they were] laid down contemporaneously with the sands and *Jurensis* beds of Gloucestershire and other counties"* ('*Northants N. H. Soc.*,' 1890, p. 99); also that they were deposited later than the "*communis*-beds." The last point may be admitted without allowing that the strata belong to the *Jurensis*-zone. The fault really lies with the zonal system of nomenclature. With the hemeral system of geological chronology it may be stated that the Upper *Leda-ovum*-beds were deposited during the hemera *Lilli*, and before the hemera *variabilis*, the strata of which are usually taken as the first portion of the *Jurensis*-zone. So these beds are contemporaneous only with the lower part of the Cotteswold Sands, the portion deposited before *Haugia jugosa* appeared.

* One remark of Mr. Thompson it is necessary to note because it states a fallacy which has led more than anything else to confusion in the matter of palæontological horizons. "A considerable change in the character of the sediment took place in the west and south-west long before it did with us in Northamptonshire, and this was necessarily accompanied by a change in the fauna generally, and particularly in the Ammonites, which latter seemed less able or willing to accommodate themselves to new conditions than lower forms" (p. 99). It is a great mistake to suppose that Ammonites were influenced by the character of the deposit, though this error has been so widely taught that nearly every writer, myself included, has argued as if it were a fact. When Dorset, Somerset, and Gloucestershire are compared, it will be found that the same species lived when the deposit was argillaceous, arenaceous, or calcareous, and flourished equally well. Notably is this the case when the Middle Lias of Dorset and of Somerset are compared; or the Lias-Oolite deposits of Dorset, Somerset, and Gloucestershire, and these again with the Continent. Further, that the Ammonite

II. Genus—*CHARTRONIA*,¹ *S. Buckman*.(Type: *Chartronia binodata*, sp. n.)

Definition. — Stenogyral, latumbilicate, binodate, versirectiradiate, septicarinata,² subornatilobate.

Note.—The binodation is a phase of development. There might be uninodate ancestors and descendants of the type-species, and yet they would belong to the same genus.

Remarks.—The nodi of the inner row are situated at some little distance from the edge of the inner margin, and there are costæ extending from them to the edge of that margin. The nodi of the outer row are rather inconspicuous; they are situated on the edge of the periphery, just beyond *L.* (superior lateral lobe).

Distinction.—The binodation distinguishes the genus from either *Lillia* or *Haugia*. The more ornate character of the suture-line separates it from *Lillia*. It may also be noted that the position of the inner row of nodi is different from anything found in *Lillia* or *Haugia*.

1. *CHARTRONIA BINODATA*, *S. Buckman*. Suppl., Plate I, figs. 11—15.

Description.—Given in the definition of the genus.

Note.—The peculiar characters of the species are, first, a row of tubercles set rather away from the inner margin; secondly, another row of small tubercles on the edge of the periphery.

Locality and Stratum.—Frocester Hill, Gloucestershire. Certainly from the "Cephalopod-bed," and, judging by the matrix, from the strata containing *Dumortieria*.

Date of Existence.—*Hemera Dumortieria* presumably.

History of the Figured Specimen.—Purchased from the collection of the late Dr. Thos. Wright, F.R.S., &c.

fauna changes quite independently of lithic conditions is shown throughout the Lias, particularly in Dorset.

It must be remembered that the fauna of any given hemera was of more than European extension, but that particular lithic characters were often excessively local, and seldom contemporaneous.

¹ In honour of M. L. Chartron, Memb. Soc. Géol. de France.

² This may be known by the impressed periphery bearing the mark of the partition-band.

III. Genus—DENCKMANNIA,¹ S. Buckman.(Type: *Denckmannia tumefacta*, sp. n.)

Definition.—Stenopachygyral, sublatumbilicate, crassornate, tuberculate, septi-carinate, pauciseptate.

Distinction.—So far as the type species of the genus is concerned it is distinguished from *Lillia* by less compression being coupled with smaller umbilication and more pronounced ornamentation. The species grouped with *Denckmannia*? *iserensis* are even more separated by the robustness of their ornamentation. They show in a marked degree a rursicostate character, and are really quite separable from the true *Denckmannia*. The only feature which they possess in common therewith is a robustness of ornament.

1. DENCKMANNIA? ISERENSIS (Oppel). Suppl., Plate II, figs. 1, 2.

1856. AMMONITES ISERENSIS, *Oppel*, *Juraf.*, p. 249.1874. — ERBAENSIS, *Dumortier* (non *Hauer*), *Études pal. Bassin du Rhône*, iv, pl. xxiii.1893. LILLIA ISERENSIS, *Bonarelli*, *Osservazioni sul Toarciano, &c.*, *Boll. della Società geol. italiana*, vol. xii, fasc. 2, p. 12 (pars).

Description.—Stenopachygyral, latumbilicate, subirregulari-crassornate, nodate, rursi-recticostate, septi-carinate (?).

Note.—The above description is drawn up from *Dumortier*'s figure. In all probability the species is septi-carinate, and there has been the usual mistake in the delineation of the carina. *Dumortier*'s specimen is chosen for the type for the reasons given under the historical remarks. The specimen now figured is considered to be a fragment of a large adult.

History.—Under the name *Am. iserensis*, *Oppel* separated, as distinct from "*Am. comensis*," a species which he said reached a foot in diameter, and was not uncommon in the ironstone of la Verpillière and St. Quentin; it was found frequently at Milhau, and occurred in Swabia. He described it as having a nearly quadrate "aperture," ribs coarse and thick on the outer whorls, a broad keel, and an appearance like *Amm. Conybearei* or *Bucklandi*, &c. Unaccompanied by any figures, or by any measurements, or by any description of the septa,

¹ In honour of Dr. August Denckmann, whose work has frequently been referred to in these pages.

such a notice cannot be held to give a name to a species, and is of no value in the matter of priority.

Meneghini¹ considered Oppel's *iserensis* to be the same as Hauer's *erbaensis*. He supposed that Oppel did not know, or pretended not to know, of Hauer's almost contemporary work; but considering that both works appeared in the same year, and that publication is often long after preparation, the idea of pretence is scarcely warranted. Meneghini placed *erbaensis* as a synonym of *comensis*, though he recognised it as a perfectly distinct form; in fact, he separated *comensis* into as many as nine distinct types.

Haug regarded *iserensis* as a synonym of *erbaensis*.

Bonarelli, however, has definitely separated *iserensis*, and has placed as synonyms *erbaensis* and *tirolensis*, Dum. (non Hauer), and *comensis*, Meneghini, pl. vi, figs. 1, 2.

It is very probable that Oppel had more than one species in view when he gave his description. Considering that Dumortier's *erbaensis* and *tirolensis* both come from the locality noted by Oppel for *iserensis*, and that they are both distinctly different forms from what Hauer described by these names, the chances certainly are that one, if not both of them, were regarded by Oppel as *iserensis*. Therefore Bonarelli is perfectly right in considering Oppel's *iserensis* as "a form quite distinct" from Hauer's *erbaensis*. Still Bonarelli gives *iserensis* too wide an application. From the series I select as the type of *iserensis* the *Am. erbaensis*, Dumortier, non Hauer (see p. xvii).

The fragment figured in Suppl., Pl. II, fig. 1, agrees with the outer whorl of Dumortier's *erbaensis*, but it is not sufficient to found a species upon. For that reason the present figure is not taken as the type. If future examples show that it is distinct from Dumortier's fossil, then it will require a new name.

Locality and Stratum.—Northamptonshire: Moulton, in the Upper *Leda-ovum* beds. Found by Mr. B. Thompson, F.G.S.

Haug² says that *erbaensis* belongs to the *jurensis*-zone; but Meneghini³ says that *comensis* (including *iserensis*, *erbaensis*, &c.) occurs with *Am. bifrons* in the red Ammonitiferous limestone of the Central Apennines, &c.

Date of Existence.—*Lilli hemera*.

¹ 'Monogr. Lias sup. Lombarde;' Pal. Lombardie, series 4, p. 22, 1867.

² Op. cit., p. 634.

³ Op. cit., p. 30.

2. DENCKMANNIA TUMEFACIA, S. Buckman. Suppl., Plate I, figs. 7—10.

Description.—Stenopachygyral, sublatumbilicate, subirregulari-crassornate, bullate, versis-recticostate, septicarinata, subpauciseptate.

Note.—The carina is strong and laterally compressed. On the core of the periphery are slight signs of furrows. The tubercles are elongated in the direction of the ribs, and are therefore technically bullæ. The ornamentation is somewhat irregular.

Distinction.—This species is like the *erbaensis* of Dumortier (non Hauer), but it is distinguished by the difference in direction of the costæ. It is also less umbilicate and more quickly coiled. It is less umbilicate and yet thicker than *robustus*, Denckmann.

Locality and Stratum.—Somerset: Shepton Beauchamp, just above where *Hildoceras bifrons* is plentiful.

Date of Existence.—*Lilli* hemera, presumably,—that is to say, it was probably earlier in date than *variabilis*, and later than *bifrons*; but the strata being very thin, it lies closely associated with them.

3. DENCKMANNIA TORQUATA, S. Buckman. Suppl., Plate III, figs. 4—6.

Description.—Platygyral, angustumbilicate, crassornate, bullate, subrursi-flexicostate,¹ septicarinata, subdensiseptate, *L.* broad.²

Note.—The umbilicus tends to become excentric, while the costæ and bullæ are retained. The rursi-flexicostate character becomes more pronounced with age.

Distinction.—The much thicker form, and the more rounded, broader periphery separate it from *Haugia illustris* (Denckm.). The combination of coarse ornamentation with a small excentric umbilicus and rather thick whorls (relatively to similarly umbilicate species) is the distinctive character of the present species.

Remarks.—The retention of the bullæ and the strong character of the ribbing, in connection with a compressed form and a small umbilicus, indicate a possible connection with *Denckmannia tumefacta*. In the same direction does the somewhat small carina point. The subrursi-flexicostate character seems to be only a later acquirement, and is not necessarily against such connection.

Locality and Stratum.—Shepton Beauchamp, Somerset, with species of *Haugia*, above *Hildoceras bifrons*.

Date of Existence.—*Variabilis* hemera.

¹ In the latter part of the whorl.

² *L.* = superior lateral lobe.

4. DENCKMANNIA ?¹ MALAGMA (Dumortier). Suppl., Plate IV, figs. 1—3.1874. AMMONITES MALAGMA, *Dumortier*, Pl. xxii, fig. 1 only.

Description.—Substeno-subleptogyral, latumbilicate, subcrassi-subirregulari-bullicostate, rursi-recti-costate, subalti-septecarinata.

Remarks.—The costæ are arranged somewhat in groups of four, whereof two unite into a fairly large bulla, while the other two come close together, are scarcely joined, and have no bulla. Of any four ribs one is distinctly larger than the others, and these larger ribs appear like raised bands across the lateral areas. The largest rib is the first in a series of four, so that the rib-sculpture may be diagrammatically represented thus: $\underbrace{1\ 2\ 3\ 4}$, the bracket denoting the connate pair.

Comparison.—With *malagma*, *Dumortier*: that author has figured under this name two species, whereof one is much more coarsely costate than the other. It is only with the coarsely costate form (his fig. 1) that comparison need be made. This comparison is not easy because the specimen represented is obviously somewhat ill preserved, so that irregularity of costation has been exaggerated. But certain points may be noticed, as follow: the diameter of *Dumortier*'s figure without carina is 96 mm., with an umbilicus of 39 mm., one whorl back 18 mm., two whorls back 8 mm. Taking the same diameter on my specimen the umbilicus is respectively 39 mm., 20 mm., 9.5 mm. This indicates that my specimen is more concentrically umbilicate. If *Dumortier*'s specimen be correctly drawn, the difference deserves careful consideration; but experience tells that exactly correct drawing in such details is very difficult to obtain.

Further remark may be made with regard to *Dumortier*'s description. He says—"With regard to the bifurcate costæ, it may be noticed that the rib which is in front is always the larger (que c'est toujours la côte qui est en avant qui est la plus volumineuse)." This does not agree with my description, but there may be an ambiguity here. Thus of ribs 1, 2 of the bifurcate series, 1 is the larger in my specimen, not 2, as *Dumortier*'s description seems to infer. Now 1 is the rib which appears first from the point of view of growth, but 2 is the rib which is in front, that is, nearer to the aperture.

Locality and Stratum.—Somerset: Shepton Beauchamp, in the "Upper Lias," just above *Hildoceras bifrons*.

Date of Existence.—*Variabilis* hemera.

¹ The assignment of this and the following species to *Denckmannia* is provisional.

5. DENCKMANNIA? ASPERA, S. Buckman.

1874. AMMONITES MALAGMA, Dumortier, iv, Pl. xxii, figs. 2—4 only.

1882. HARPOCERAS VARIABILE, Wright, Pl. lxviii.

1890. HAUGIA VARIABILIS, var. a, This Monograph, p. 147 (pars).

Description.—Platygyral, sublatumbilicate, irregulari-crassornate, bullate, subrursi-recticostate tending to flexicostate, subalti-septicarinata.

Distinction.—From *variabilis*, by coarser, more irregular ornamentation. In the points where it differs from *variabilis* it most resembles *malagma*, fig. 1, but that is still more coarsely ornate. Dumortier also shows another less coarsely ornate fossil as *malagma* (figs. 2—4), which appears to belong to the present species. It is certainly different from his fig. 1, to which the name *malagma* must be restricted.

Remarks.—A very fine side view is shown by Wright, but not a front view.

Localities and Strata.—Gloucestershire: Nailsworth, Wright's specimen (evidently from the Cotteswold sands); Somerset: Shepton Beauchamp ("Upper Lias").

Date of Existence.—*Variabilis* hemera.

6. DENCKMANNIA? OBTECTA, S. Buckman. Suppl., Plate IV, figs. 4—6.

1890. HAUGIA VARIABILIS, var. a, This Monograph, p. 147 (pars).

Description.—Platyleptogyral, angustumbilicate, subparvi - subrursi - subflexi-costati-bullate, subalti-septicarinata.

Remarks.—The bullæ fail at a diameter of about 80 mm.; the costæ become irregular and obsolete at about 120 mm.; after that the test is smooth except for some obscure undulations.

Where the bullæ are most prominently developed, the occlusion by the succeeding whorl reaches nearly up to the bullæ themselves, so that there is no costate space between them and the inner edge of the next whorl. Afterwards a costate space appears, partly because the bullæ decline in size, partly because the inner margin recedes.

Distinction.—From *aspera*, less umbilicate and less coarsely costate; from *variabilis*, the earlier failure of tubercles, the less coarse costæ, the want of a regular costate space between bullæ and inner edge of succeeding whorl, greater irregularity of ornament.

Locality and Stratum.—Gloucestershire : Coaley Wood, in the Cotteswold Sands (Bed 16 of section vi, p. 45).

Date of Existence.—*Variabilis* hemera.

IV. Genus—HAUGIA, S. Buckman.

(Type : *Haugia variabilis*, d'Orbigny sp.)

1888. HAUGIA. This Monogr., p. 45, 1889, p. 142.

Definition.—Subplatyleptogyral, sublatumbilicate, subcrassornate, versi-recti-radiate, alti-septecarinate, subdensiseptate, subornati-lobate.

Remarks.—The species placed under *Haugia* are really capable of further division. The arrangement is confessedly somewhat arbitrary.

Distinction.—In general *Haugia* is less strongly ornate than *Denckmannia*, but rather more ornate than *Lillia*. It is more carinate than either.

The comparison of *Haugia* and *Lillia* is difficult because the species referred to the genera are not in the same degree of phyletic development. But Bayle's pl. lxxxii shows in figures of *Lillia Lilli* and "*Hammatoceras Ogerieni*" some of the differences which may be expected between the species of the two genera.

A. The *navis*-group.

The greater proportionate compression in conjunction with similar umbilication, and the greater development of the carina, distinguish this group from *Denckmannia*. The ornamentation of *Denckm. torquata*, much coarser than that of adult *H. navis*, the carina less developed, and the *L.* broad instead of narrow, show that that species cannot belong here.

1. HAUGIA NAVIS (*Dumortier*). Suppl., Plate II, figs. 5—7.

1874. AMMONITES NAVIS, *Dum.*, Pl. xx, figs. 3—5.

Description.—Subplatyleptogyral, sublatumbilicate, subcrassornate, subrursi-recticostate, alti-septecarinate, subdensiseptate, *L.* narrow.

Distinction.—This species is distinguished from *variabilis* chiefly by coarser, more irregular ornamentation. It also seems to be more quickly coiled and rather thicker.

Locality and Stratum.—Somerset : Barrington, near Ilminster, "Upper Lias," above *Hildoceras bifrons*.

Date of Existence.—*Variabilis* hemera.

B. The rursiradiate group.

2. HAUGIA aff. VARIABILIS. Plate XXV, fig. 2.

- ? 1844. AMMONITES VARIABILIS, *d'Orbigny*, Pl. cxiii, figs. 3, 4.
 1878. HAMMATOCERAS OGERIENI, *Bayle*, Pl. lxxxii, fig. 2.
 1890. HAUGIA VARIABILIS, *This Monograph*, Pl. xxv, fig. 2, p. 146 (pars).

The form depicted in these figures seems to differ from *variabilis* chiefly in being rursicostate. This character is shown in d'Orbigny's young specimen (Pl. cxiii, figs. 3, 4). How much and how long it was a character of *variabilis*, if it was a character at all, is somewhat difficult to determine from d'Orbigny's reduced figure of his large specimen.

Locality and Stratum.—North Nibley (Cotteswold Sands).

Date of Existence.—*Variabilis* hemera.

3. HAUGIA sp.

1882. HARPOCERAS VARIABILE, *Wright*, Pl. lxvii, figs. 1, 2.

This is less umbilicate than d'Orbigny's figure of *variabilis*. It also seems to be rursicostate.

Locality and Stratum.—Dorset: "sands between Lias and Inferior Oolite, near Bridport," *Wright*, p. 448. I have some doubts with regard to the locality and the horizon, as they do not agree with my experience.

c. The *variabilis*-group.4. HAUGIA VARIABILIS (*d'Orbigny*). Plate A, fig. 34, p. 146 (pars).

1844. AMMONITES VARIABILIS, *d'Orbigny*, Pl. cxiii, figs. 1, 2 only.
 1853. — — — *Chapuis et Dewalque*, Pl. ix, fig. 2.
 ? 1882. HARPOCERAS VARIABILE, *Wright*, Pl. lxvii, figs. 5, 6.
 1890. HAUGIA VARIABILIS, *This Monogr.*, Pl. A, fig. 34, p. 146 (pars).

The shell depicted by Dr. Wright seems to represent d'Orbigny's species; but there are some slight errors in regard to the drawing,¹ and the reduction in d'Orbigny's figure makes determination somewhat difficult.

¹ See p. 146, foot-note.

Correction.—It is doubtful if the rursicostate character is a feature of this species, for d'Orbigny's small specimen (figs. 3, 4), wherein it is shown, may not really be a young *variabilis*.

Remarks.—In regard to d'Orbigny's figure of *variabilis*, it may be noted—that the costæ are not equally distant, but that they are somewhat bunched in a triform arrangement with wider interspaces; that there is a definite costate space between the nodi and the inner edge of the next whorl; that the umbilicus is large and fairly concentric; and that the compression is considerable.

The specimen which I possess does not show any irregularity in the width between the groups of costæ. It agrees in other respects, but identification with *variabilis* may not be correct; nor does the specimen formerly in Dr. Wright's possession show this irregularity of costation.

Localities and Strata.—Gloucestershire: North Nibley (Cotteswold Sands, Bed 30, section vii, p. 46); Dorset: "sands between Lias and Inferior Oolite, near Bridport," Wright, p. 458. It is possible the writer may have been mistaken on these points.

Date of Existence.—*Variabilis* hemera.

5. HAUGIA OGERIENI (*Dumortier*).

1874. AMMONITES OGERIENI, *Dumortier*, Pl. xix, fig. 5.

Description.—Subplatyleptogyral, sublatumbilicate, versicostate, nodate, septecarinate.

History of Specific Name.—Dumortier figures two specimens as *Ogerieni*. The one marked fig. 5 is more umbilicate than the example placed as figs. 3, 4. Since the latter appears to be the same as Sowerby's *jugosus*, the former may now be taken for the type of *Ogerieni*.

Remarks.—A specimen about 205 mm. in diameter from Shepton Beauchamp is distinct from any other similarly large specimens of *Haugia*, and it appears to be the adult of Dumortier's *Ogerieni* as now defined; but the centre is too ill-preserved to allow of exact comparison.

Localities.—Gloucestershire: North Nibley (Cotteswold sands); Somerset: Shepton Beauchamp ("Upper Lias").

Date of Existence.—*Variabilis* hemera.

6. *HAUGIA PATELLIFORMIS*, *S. Buckman*. Suppl., Plate III, figs. 1—3.

Description.—Platyleptogyral, versiparvicostate, parvinodate, septecarinate, subdensiseptate, *L.* broad.

Note.—The inclusion decreases with age, so that the species is angustumbilicate in youth, and latumbilicate when adult.

Distinction.—Less ornate than *Ogerieni*. The extreme compression makes it a very distinct form.

Localities and Strata.—Gloucestershire: Coaley Wood (Cotteswold Sands); Somerset: Shepton Beauchamp ("Upper Lias," with other species of *Haugia*).

Date of Existence.—*Variabilis* hemera.

7. *HAUGIA JUGOSA* (*Sowerby*). Plate XXIII, figs. 11—13.

1815. *AMMONITES JUGOSUS*, *Sowerby*, Pl. xcii, fig. 1.

1874. — *OGERIENI*, *Dumortier*, Pl. xix, figs. 3, 4.

1889. *HAUGIA VARIABILIS*, This Monogr., Pl. xxiii, figs. 11—13.

1890. — *JUGOSA*, This Monogr., p. 149, in correction.

Description.—Platyleptogyral, subangustumbilicate, versirecticostate, parviregularinodate, alti-septecarinate.

History.—I refigured *Sowerby's jugosus*, which is a rather unsatisfactory specimen, and compared therewith two other examples, a small and a large one. But they do not strictly agree with it, and their separation is necessary.

The drawing of *Sowerby's* original specimen given in the body of this work was, owing to defective preservation, somewhat unsatisfactory. In order to make better comparison Mr. G. C. Crick, F.G.S., of the British Museum, has kindly developed the other side of the type. It shows that, in the side view depicted, the nodi are not conspicuous enough, and the costæ are not sufficiently distinct.

Remarks.—If *Sowerby's* species be now correctly identified with an adult in my collection, then *jugosus* when somewhat fully grown is thicker and costate for a longer time than the specimen depicted in Pl. XXIV.

Localities and Strata.—Somerset: White Lackington Park, near Ilminster,

Sowerby's type ["Upper Lias"]: Shepton Beauchamp, near Ilminster ("Upper Lias").

Date of Existence.—*Variabilis* hemera.

8. *HAUGIA GRANDIS*, S. Buckman. Plate XXIII, figs. 14, 15; Plate XXIV; Plate XXV, fig. 1; Plate XXVIII, figs. 1—3 (?); Suppl., Pl. II, fig. 11.

1889. *HAUGIA VARIABILIS*, This Monogr., Pl. xiii, figs. 14, 15.

1890. — *JUGOSA*, Ibid., p. 149; Pl. xxiv; Pl. xxv, fig. 1; Pl. xxviii, figs. 1—3 (?).

Description.—Platyleptogyral, subangust-excentri-umbilicate, subprorsi-recticostate, parvi-subirregularinodate, alti-septecarinata.

History.—A young form, though supposed to be identical with *Am. jugosus*, Sow., was figured first as *Haugia variabilis* for reason given in explanation of Pl. XXIII. This was subsequently altered to *Haugia jugosa*, by which name an adult was also figured.

Remark.—The adult is a little more irregularinodate than the smaller example.

Distinction.—From *jugosa*:—strictly compared with Sowerby's original, the smaller example of this species is slightly less umbilicate, a point of importance where young specimens are concerned. Further, it has smaller ribs less widely separated, the ribs have a slight forward inclination on the lateral area, and they join the carina with a distinct though slight turn forwards on the periphery. It is also slightly thinner altogether.

From *Oyerieni*, more angustumbilicate in youth. From *patelliformis*, more distinctly costate and less acute peripherally.

Localities and Strata.—Gloucestershire: Coaley Wood (Cotteswold Sands, Bed 16, sect. vi, p. 45); North Nibley (Cotteswold Sands, Bed 30, sect. vii, p. 46); Chalford Waterworks, near Stroud ("Upper Lias"). Somerset: Piple Bottom, North Stoke (in an ironshot limestone—E. Wilson, F.G.S.).

Date of Existence.—*Variabilis* hemera.

9. *HAUGIA ILLUSTRIS* (*Denckmann*).

1887. *AMMONITES* (*HAMMATOCERAS*) *ILLUSTRIS*, *Denckm.*, Pl. vi, fig. 1.

Remarks.—Denckmann shows three specimens under the name *illustris*, of

which one (Pl. iii, fig. 6) is not the same genus, not even one of the *Lillia-Haugia* series. The other two differ in degree of coarseness of costation. The larger specimen is selected as the type.

A specimen well in agreement therewith has been obtained from Shepton Beauchamp at a horizon corresponding with that noted by Denckmann—namely, beneath *striatulus*. This specimen differs from those figured in this Monograph as *illustris*—from fig. 3 (Pl. XXVI) by smaller umbilicus, from fig. 4 by less definite tubercles but rather more definite costæ.

Localities and Strata.—Somerset: Shepton Beauchamp ("Upper Lias," between *bifrons* and *striatulus* [*toarcensis*]). Gloucestershire: North Nibley (Cotteswold Sands).

Date of Existence.—*Variabilis* hemera.

10. HAUGIA aff. ILLUSTRIS. Plate XXVI, figs. 3—5.

1890. HAUGIA ILLUSTRIS, This Monogr., Pl. xxvi, figs. 3—5.

Remarks.—The reference of these specimens to *illustris* can scarcely be maintained.

The two specimens can hardly both belong to one species, but the material is insufficient and badly preserved.

11. HAUGIA COMPRESSA, *S. Buckman*. Suppl., Plate II, figs. 8—10.

1844. AMMONITES VARIABILIS, *d'Orbigny*, Pl. cxiii, figs. 5, 6 only.

1887. AMMONITES (HAMMATOCERAS) ILLUSTRIS, *Denckm.*, Pl. v, fig. 2 only.

Definition.—Platyleptogyral, angustumbilicate, parvibullate, versi-subflexi-parvicostate, septicarinate.

Note.—The adult would no doubt be subexcentri-latumbilicate.

Distinction.—From *jugosa*—less ornate; from *Ogerieni*—the same, and less umbilicate; from *patelliformis*—more distinctly tuberculate, more distinctly and more closely costate; from *Werthi*—less flexicostate, more distinctly tuberculate.

Localities and Strata.—Gloucestershire: The Waterworks, Chalford, near Stroud ("Upper Lias," with other tuberculate species of *Haugia*); Coaley Wood (Cotteswold Sands). Somerset: Shepton Beauchamp ("Upper Lias").

Date of Existence.—*Variabilis* hemera.

The non-tuberculate, or *Eseri* group.

This name may describe the platyleptogyral, angustumbilicate, non-tuberculate species of the *Lillia-Haugia* series. It is almost certain that they are polygenetic, the development of different tuberculate species. Somewhat enlarged costæ near the inner margin in certain cases point to ancestral tubercles, elongated on account of greater involution.

The description of the species as *Haugia*? is merely a matter of convenience. It is probable they belong to more than one genus, some perhaps to *Lillia* as descendants of *Lillia Lilli*, some to *Phymatoceras*, &c.

12. HAUGIA? OCCIDENTALIS (*Haug*). Plate XXVII, figs. 1, 2.

1890. HAUGIA OCCIDENTALIS, This Monogr., Pl. xxvii, figs. 1, 2, p. 154.

Remarks.—The specimen figured with the above name differs from the example depicted by Haug; it is certainly more umbilicate and more coarsely costate. It may deserve separation.

Locality and Stratum.—Gloucestershire: Little Sodbury (Sands).

Date of Existence.—*Striatuli* hemera.

13. HAUGIA? ESERI (*Oppel*). Plate XXV, figs. 3, 4.

1890. HAUGIA ESERI, This Monogr., Pl. xxv, figs. 3, 4, p. 155.

Remarks.—The specimen referred to seems to agree particularly with what must be taken as the type, namely, Quenstedt's *Ammonites radians compressus* in 'Cephalopoden,' pl. vii, fig. 9.

It was pointed out at p. 156 that the other specimens do not agree so well. It seems desirable to separate them.

Localities and Stratum.—Gloucestershire: Coaley Wood; Cam Down; North Nibley; Whitehall Farm, Alderley (in all cases lower portion of the Cephalopod bed).¹

Date of Existence.—*Striatuli* hemera.

¹ This and the associated species of the group are generally found just on the top of the lowest limestone band.

14. HAUGIA ? FASCIGERA, *S. Buckman*. Plate XXV, fig. 7.1890. HAUGIA ESERI, *This Monogr.*, Pl. xxv, fig. 7, p. 156.

Remarks.—This is a more compressed, more umbilicate form than *Eseri*, and it is also distinguished by somewhat irregular fasciation of rather more flexed costæ.

Localities and Strata.—Gloucestershire: Stinchcombe Hill, and North Nibley (Cephalopod bed with *Eseri*); Sodbury (in a sandstone rock).

Date of Existence.—*Striatuli* hemera.

15. HAUGIA ? INÆQUA, *S. Buckman*. Plate XXV, figs. 5, 6; Plate A, fig. 37.? 1862. AMMONITES ESERI, *Oppel*, Pal. Mitth., pl. xlv, fig. 3.1890. HAUGIA ESERI, *This Monogr.*, Pl. xxv, figs. 5, 6; Pl. A, fig. 37, p. 156.

Remarks.—This form agrees in umbilication with the true *Eseri*, but is distinguished by irregularity of costation, and it is slightly thinner. It is less umbilicate than *fascigera*. The specimen figured by *Oppel* is more regularly costate.

Localities and Strata.—Gloucestershire: North Nibley, Stinchcombe, and Breakheart Hill, near Dursley (in the Cephalopod-bed with the foregoing). Somerset: Dundry Hill (E. Wilson, F.G.S.).

Date of Existence.—*Striatuli* hemera.

16. HAUGIA ? SCULPTA, *S. Buckman*. Plate XXVI, figs. 1, 2.1890. HAUGIA ESERI, *This Monogr.*, Pl. xxvi, figs. 1, 2.

Remarks.—This is really quite distinct from true *Eseri*—the coarse, fasciate costæ will separate it. It is, however, also more umbilicate and thicker. Costation and thickness distinguish it from *fascigera*.

Locality and Stratum.—Gloucestershire: North Nibley (with the foregoing).

Date of Existence.—*Striatuli* hemera.

Of this *Eseri*-group there are in my cabinets just as many forms again which require to be figured and named.

Distinction.—The flexicostate character is a good noticeable feature.

Locality and Stratum.—Gloucestershire: North Nibley (Cotteswold Sands, Bed 18, section vii, p. 46).

Date of Existence.—*Variabilis* hemera.

2. PHYMATOCERAS PAUPER, *S. Buckman*. Suppl., Plate III, figs. 7—9.

Description.—Platyleptogyral, angustumbilicate, subflexi-parvi-densicostate, parvituberculate, septicarinata.

Distinction.—The species is distinguished from *Am. Werthi*, Denckmann, by smaller umbilicus and more distant, straighter ribbing.

Localities and Stratum.—Gloucestershire: Coaley Wood (in Bed 13 of the section given at p. 45: it is therefore rather more than ten feet above *Haugia grandis*: it occurs with large *Limæ*, probably *L. toarcensis*, Dum.); North Nibley (Bed 20, p. 46).

Date of Existence.—*Variabilis* hemera.

VI. Genus—BRODIEIA,¹ *S. Buckman*.

(Type: BRODIEIA CURVA, sp. n.)

The *Bayani*-group.

Definition.—Platypachygyral, excentri-angustumbilicate, flexiradiata, parvicarinate.

Remarks.—In their mode of growth the species of this genus differ from all other members of the *Lillia-Haugia* series. There is a combination of a small umbilicus, stout whorls, a broad periphery, and a small carina, in which even if there were any septation such a character would be recognised only with great difficulty. In other members of the *Lillia-Haugia* series, when a small umbilicus is attained, the whorls are thin, and the carina is strongly elevated with a very noticeable septation. The nearest approach in shape is found in *Phymatoceras Dumortieri*, but the elevated septicarina at once forms a distinction in that case.

For the present the species of the *Bayani*-group may be known as *Brodieia*; but probably further separation will be required, as there are recti- and flexiradiate forms. There is a noticeable scarcity of any of these species in this

¹ In memory of the Rev. P. B. Brodie, F.G.S., my father's friend and fellow-worker.

country, so that the present classification depends mainly on figures. But it may be remarked that the true *Bayani*-group would be the recticostate species, while circumstances render it desirable to choose as the type of *Brodieia* a flexicostate form. Wherefore it is possible that in the future the true *Bayani*-group, that is the recticostate species, may require another generic name than *Brodieia*.

1. *BRODIEIA JUNCTA*, *S. Buckman*. Suppl., Plate IV, figs. 7—9.

Cf. 1874. AMMONITES *BAYANI*, *Dumortier*, Pl. xiv, figs. 7—9.

Description.—Platypachygyral, excentri-angustumbilicate, subrursi-parvi-sub-recticostate, parvicarinate.

Remarks.—The small carina is set in a slightly flattened area of a rather broad periphery, and so the periphery might be termed obsoletely carinatisulcate.

Two, sometimes three costæ are connate on the inner area to form larger ribs.

Distinction.—The periphery distinguishes it from *Bayani*, which is distinctly carinatisulcate. Excentri-umbilication also begins earlier in this form.

Locality and Stratum.—Barrington, Somerset ("Upper Lias," with *Haugiæ*).

Date of Existence.—*Variabilis* hemera.

2. *BRODIEIA CURVA*, *S. Buckman*. Plate XXII, figs. 35, 36.

1889. INCERTÆ SEDIS, *This Monogr.*, Pl. xxii, figs. 35, 36.

Description.—Platypachygyral, excentri-angustumbilicate, flexicostate, non-tuberculate, connaticostate, parvicarinate.

Remarks.—The style of ribbing is fairly well shown in the figure. A slightly stouter rib on the inner area breaks into two waved ribs. The ribs have not much peripheral projection, but still there is a decided forward turn.

Localities and Stratum.—Gloucestershire: North Nibley (Cotteswold sands, Bed 30, section vii, page 46).

Date of Existence.—*Variabilis* hemera.

The next species is only placed as *Brodieia*? for convenience. It is not that genus, though it has somewhat similar ornament; but it lacks the association of stout whorls with angustumbilication. It is nodate, and yet leptogyral. It has

SUPPLEMENT, PLATE I.

Lilli hemera.

Figs. 1—6.—*LILLIA LILLI*, *Hauer.*

Fig. 1.—Side view of a typical but immature specimen without test. The + shows the position of the last septum, and the O where the partition-band terminated, as indicated by the shape of the periphery. Shepton Beauchamp, Somerset. My Collection. (Page xiv.)

Fig. 2.—A portion of the periphery taken at the place marked *a*. Attached to the lower part may be seen a piece of the infilling of the septicarina: this infilling has been shifted, and has become cemented again during fossilisation.

Fig. 3.—Outline of the whorl at the commencement of the body-chamber. What appears as carina is only the infilling.

Fig. 4.—Portions of three consecutive septa, taken at a diameter, for the middle one, of about 40 mm., showing the long *L* and also the very small *l* on the upper edge of the inner margin—the dotted line.

Fig. 5.—Radial curves.

Fig. 6.—Portion of the body-chamber of a large adult (senile?) specimen, which probably measured over 300 mm. in diameter. It is not certain that it is *L. Lilli*, but it belongs to a closely related fossil. It probably measured 68 mm. in whorl-thickness, but the other side is incomplete. Found loose at Trent, Somerset; but its horizon is unmistakable, as embedded in the back of it are portions of two examples of *Hildoceras bifrons*.

Figs. 7—10.—*DENCKMANNIA TUMEFACIA*, *S. Buckman.*

Fig. 7.—Side view, showing the large, coarse ribs. The specimen possesses the test, but is not altogether in good condition; the centre of the umbilicus is wanting. From just above *Hildoceras bifrons*. Shepton Beauchamp, Somerset. My Collection. (Page xix.)

Fig. 8.—Peripheral view.

Fig. 9.—Outline of the whorl-section.

Fig. 10.—Portions of two septa. The superior lateral lobe of one and the siphonal lobe of its successor are given in position to illustrate the size of the loculus. The superior lateral lobe is apparently tridactyloid, with very isosceloid terminal lobule, and much abbreviated inner lobule.

Dumortieria hemera, probably.

Figs. 11—15.—*CHARTRONIA BINODATA*, *S. Buckman.*

Fig. 11.—Side view of a poorly preserved specimen destitute of test. Purchased from the Collection of the late Dr. Wright, F.R.S. It is labelled "Frocester Hill." It is certainly from the Cephalopod-bed; and by the matrix probably from the *Dumortieria*-bed. Now in my Cabinet. (Page xvi.)

Fig. 12.—Front view of the same specimen to show the presence of rudimentary nodi towards the outer ends of the costæ. These pimples are situated on the edge of the periphery, between the siphonal and superior lateral lobes. The septicarina of this specimen is lost, but there remains a distinct imprint of the partition band.

Fig. 12 *a*.—Part of the periphery enlarged twice, to show the small nodi and the imprint of the partition band.

Fig. 13.—Portions of two suture-lines at 56 mm. diameter.

Fig. 14.—The same at 67 mm. diameter. The superior lateral lobe is not dactyloid, but may be said to be somewhat claviform.

Fig. 15.—Radial curves of the same specimen.

Fig. 6.

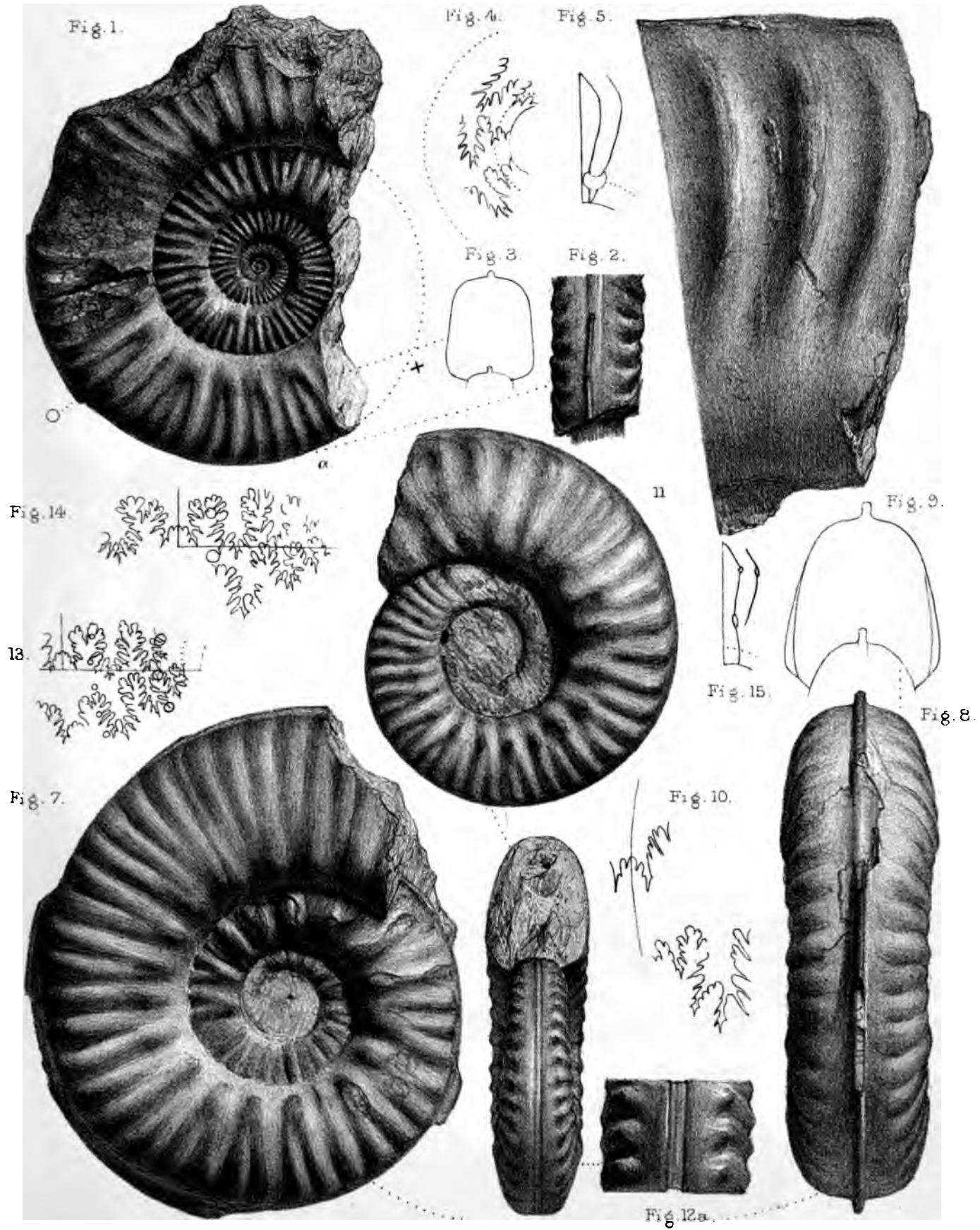


Fig. 12.

SUPPLEMENT, PLATE II.

Lilli hemera.

Figs. 1, 2.—*DENCKMANNIA ? ISERENSIS (Oppel).*

Fig. 1.—Side view of a fragment found in the Upper *Leda-ovum*-beds at Moulton, near Northampton, by Mr. B. Thompson, F.G.S. In his Collection. (Page xvii.)

Fig. 2.—Outline of the whorl-section, one side restored.

Figs. 3, 4.—*LILLIA NARBONENSIS, S. Buckman.*

Fig. 3.—Side view of a very inferior fragment reduced one-half natural size. From the Upper *Leda-ovum*-beds, Moulton. Collection of Mr. B. Thompson, F.G.S. (Page xiv.)

Fig. 4.—Outline of the whorl-section, natural size.

Variabilis hemera.

Figs. 5—7.—*HAUGIA NAVIS (Dumortier).*

Fig. 5.—Side view of a somewhat poorly preserved wholly septate specimen. From the so-called "Upper Lias," Winsmoor Hill, Barrington, Somerset. My Collection. (Page xxii.)

Fig. 6.—Front view.

Fig. 7.—Parts of two consecutive suture-lines.

Figs. 8—10.—*HAUGIA COMPRESSA, S. Buckman.*

Fig. 8.—Side view of a wholly septate specimen. From a bluish-green marl usually called "Upper Lias." The Waterworks, Chalford, Gloucestershire. My Collection. (Page xxvii.)

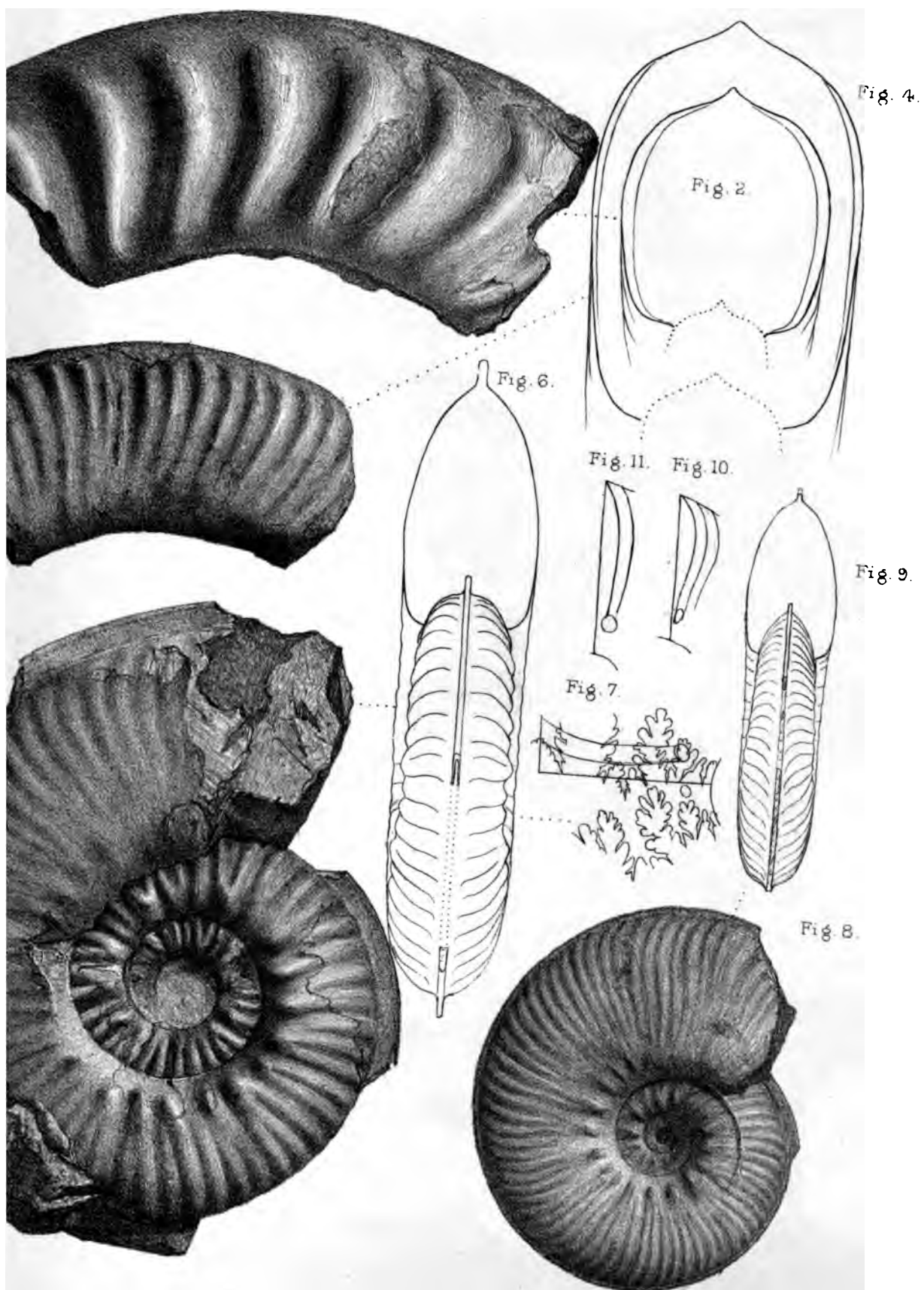
Fig. 9.—Front view.

Fig. 10.—Radial curve.¹

Fig. 11.—*HAUGIA GRANDIS, S. Buckman.*

Fig. 11.—Radial curve of the shell figured in Pl. XXIII, figs. 14, 15. (Page xxvi.)

¹ The curve in the septicarinate spines is followed up to, but is not continued over, the carina.



SUPPLEMENT, PLATE III.

Variabilis hemera.

Figs. 1—3.—*HAUGIA PATELLIFORMIS*, *S. Buckman.*

Fig. 1.—Side view of a portion of a wholly septate specimen. The details have been supplemented from the other side. From the so-called "Upper Lias," Shepton Beauchamp, Somerset. My Collection. (Page xxv.)

Fig. 2.—Outline of the whorl-section.

Fig. 3.—Suture-lines.

Figs. 4—6.—*DENCKMANNIA TORQUATA*, *S. Buckman.*

Fig. 4.—Side view of a wholly septate specimen, reduced to two-thirds of the natural size. From the so-called "Upper Lias," Shepton Beauchamp, Somerset. My Collection. (Page xix.)

Fig. 5.—Outline of the whorl-section, natural size.

Fig. 6.—Suture-lines and radial curves.

Figs. 7—9.—*PHYMATOCERAS PAUPER*, *S. Buckman.*

Fig. 7.—Side view of a somewhat poorly preserved shell. Details have been supplemented from the other side. From the Cotteswold Sands, Coaley Wood (Bed 13, section vi, p. 45). (Page xxxi.)

Fig. 8.—Outline of the whorl-section, restored slightly.

Fig. 9.—Radial curve.

Fig. 9.

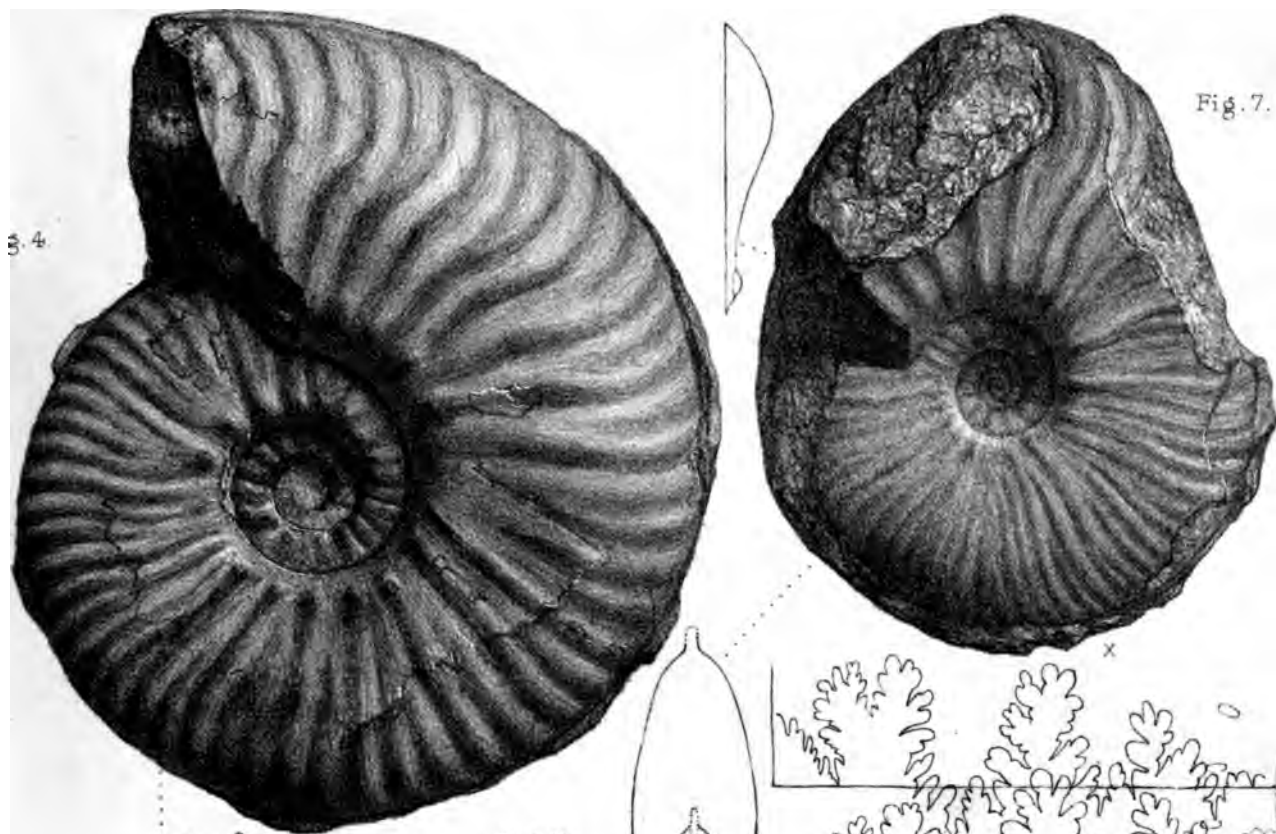


Fig. 7.

Fig. 8.

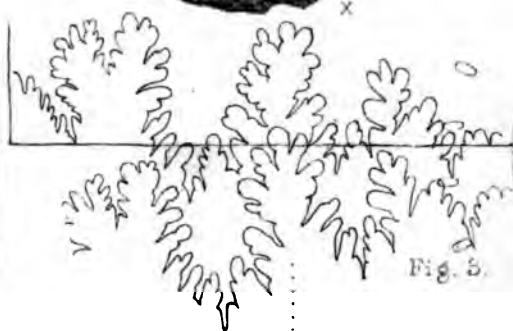


Fig. 5.

Fig. 6.



Fig. 5.

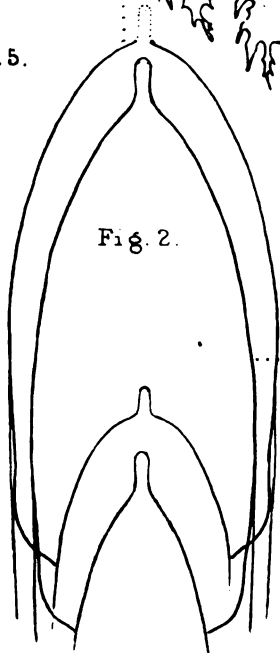


Fig. 2.



Fig. 1.

1

SUPPLEMENT, PLATE IV.

Variabilis hemera.

Figs. 1—3.—DENCKMANNIA? MALAGMA (*Dumortier*).

Fig. 1.—Portion of the side view of an example from the so-called "Upper Lias," Shepton Beauchamp, Somerset. My Collection. (Page xx.)

Fig. 2.—Outline of the whorl-section.

Fig. 3.—Radial curve.

Figs. 4—6.—DENCKMANNIA? OBTECTA, *S. Buckman*.

Fig. 4.—Portion of the side view of a specimen from Cotteswold Sands, Coaley Wood (Bed 16, section vi, p. 45). My Collection. (Page xxi.)

Fig. 5.—Outline of the whorl-section.

Fig. 6.—Radial curve.

Figs. 7—9.—BRODIEIA JUNCTA, *S. Buckman*.

Fig. 7.—Side view. From so-called "Upper Lias," Barrington, Somerset. My Collection. (Page xxxii.)

Fig. 8.—Outline of the whorl-section.

Fig. 9.—Parts of suture lines. 9 *a*.—Radial curve.

Murchisonæ or *Bradfordensis hemera.*

Figs. 10—12.—COSMOGYRIA OBTUSA (*Quenstedt*).

Fig. 10.—Side view. Dundry, Somerset. Collected by the late Mr. E. Wilson, F.G.S., to whom I am indebted for its addition to my cabinet. (Page liii.)

Fig. 11.—Outline of the whorl-section.

Figs. 12, 12 *a*.—Suture lines. 12 *b*, *c*, *d*.—Radial lines.

Bradfordensis hemera.

Figs. 13—15.—COSMOGYRIA SUBTABULATA, *S. Buckman*.

Fig. 13.—Side view. Quarry Hill, Chideock, Dorset; from the "red beds." My Collection. (Page liii.)

Fig. 14.—Peripheral view (outline). 11 *a*.—Outline of whorl-section.

Figs. 15, 15 *a*.—Suture lines. 15 *b*.—Radial line.

Figs. 16—18.—WELSCHIA RUSTICA, *S. Buckman*.

Fig. 16.—Side view. Stoke Knap, Dorset; from the "Building Stone." My Collection. (Page lii.)

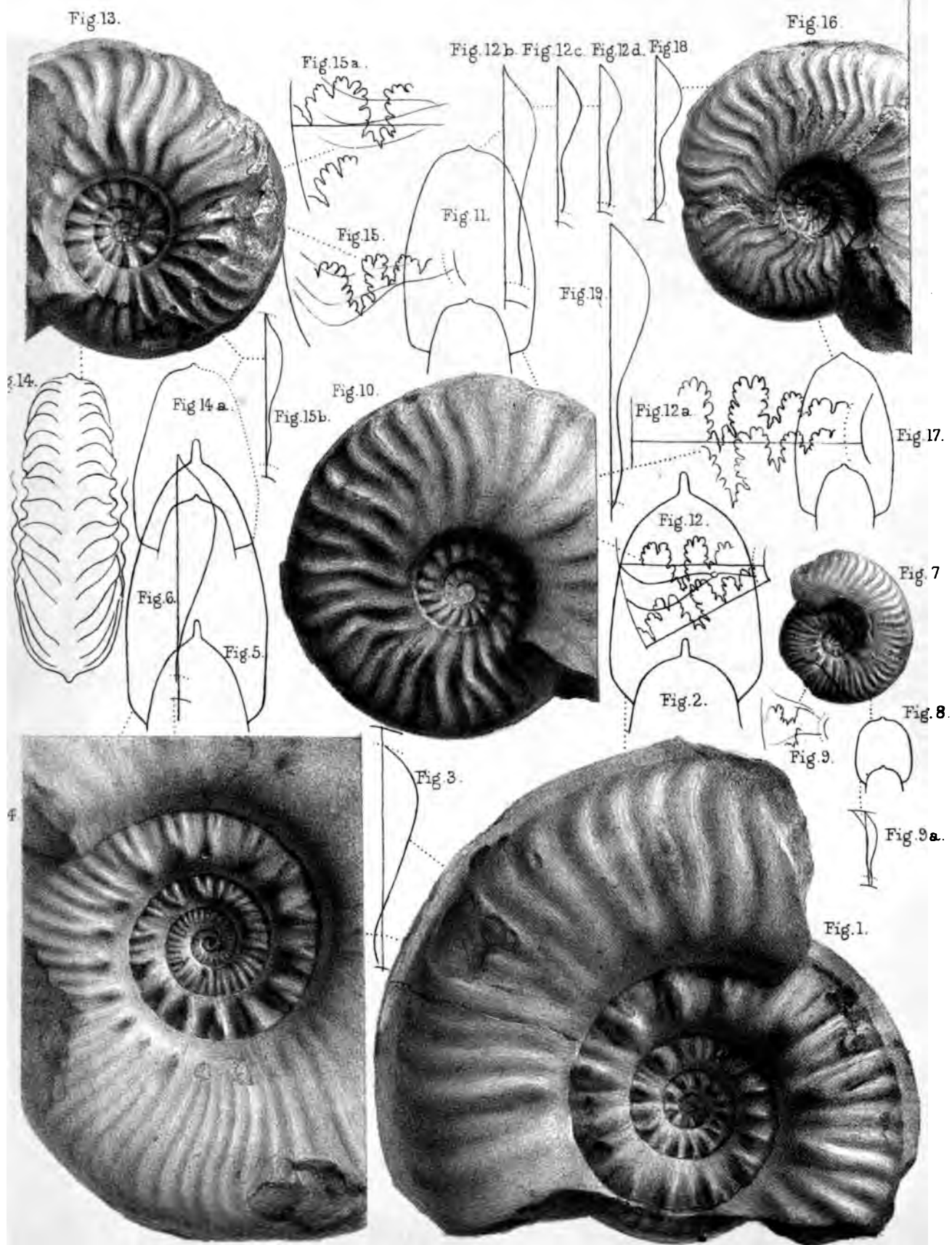
Fig. 17.—Outline of whorl-section.

Fig. 18.—Radial line.

Murchisonæ hemera.

Fig. 19.—WELSCHIA OBTUSIFORMIS, *S. Buckman*.

FIG. 19.—Radial line of the specimen figured in Plate I as *Ludwigia Murchisonæ*, which should now be altered. (Page lii.)



THE
PALÆONTOGRAPHICAL SOCIETY.

INSTITUTED MDCCCXLVII.

VOLUME FOR 1899.

L O N D O N :

MDCCCXCIX.

A MONOGRAPH

ON THE

INFERIOR OOLITE AMMONITES

OF

THE BRITISH ISLANDS.

BY

S. S. BUCKMAN, F.G.S.,

HONORARY MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY; HONORARY SECRETARY OF THE COTTESWOLD
NATURALISTS' FIELD CLUB, ETC.

PART XI.

SUPPLEMENT:

II.—REVISION OF, AND ADDITION TO, THE HILDOCERATIDÆ.

PAGES xxxiii—lxiv; PLATES V—XIV.

LONDON:

PRINTED FOR THE PALÆONTOGRAPHICAL SOCIETY.

1899.

PRINTED BY ADLARD AND SON,
BARTHOLOMEW CLOSE, E.C., AND 20, HANOVER SQUARE, W.

general characters nearest to *Phymatoceras*, but lacks the bisulcate periphery found in the stenogyral species of that genus; besides, the carina is small and non-septate.

3. BRODIEIA ? WITCHELLI, *S. Buckman*. Plate XXIII, figs. 9, 10.

1889. LUDWIGIA sp., This Monogr., Pl. xxiii, figs. 9, 10.

Description.—Substeno-leptogyral, excentrumbilicate, parvinodate,¹ rursiflexicostate, parvi-nonsepti-carinate.

Localities and Stratum.—Gloucestershire: Nailsworth (Cotteswold Sands—E. Witchell, F.G.S., the figured specimen); Standish Beacon (Cotteswold Sands).

Date of Existence.—*Variabilis* hemera.

While this sheet is passing through the press, Mr. G. C. Crick, F.G.S., informs me that a genus "*Brodia*" is already in use for fossil insects. Therefore it is necessary to substitute *Brodiceras* for *Brodieia* above.

The Genus *Lioceras* and opalinoid Ammonites.

There is very considerable trouble here, and so it is necessary to make the following prefatory remarks:

Hyatt established the genus *Lioceras*, and referred thereto eight species of what may be called platyleptogyral, angustumbilicate, striate or subcostate Ammonites. Bayle employed it as a generic designation in a somewhat similar manner, but omitted therefrom the species *opalinus*, which he referred to *Ludwigia*.

When I discussed the genus *Lioceras*² I selected from Hyatt's original series three species which, as it seemed to me, possessed genetic affinity. From these three species I chose *opalinus* to be the type of the genus. Of the remainder of Hyatt's original series I placed *lythensis* as the type of another genus, *Pseudo-lioceras*; *discoides* as the type of yet a third genus, *Polyplectus*; while in a later communication I gave definite restriction to the genus *Harpoceras*, constituting *falcifer* as its type species: that genus would probably embrace the remainder of Hyatt's original series.

So far the matter is sufficiently straightforward. *Opalinus* is the type of *Lioceras*, although its selection for that position was founded on more than one misconception, particularly a mistake as regards the genetic affinity of the species

¹ The nodi are a little elongate in the direction of the costæ.

² This Monogr., p. 12.

associated with it. But it is desirable that that should not affect the selection when once made. The difficulty is to identify *opalinus*.

There are a number of platyleptogyral, striate Ammonites which have been regarded as *opalinus*: the figures by different authors bear testimony to that. They are all very like one another; but, first, there are differences in umbilication. All the latumbilicate forms may be at once excluded, for *opalinus* is angust-umbilicate,—in fact, practically subconcavi-umbilicate. Secondly, examination of the remaining series reveals differences in the curve of the radial line.

Of the radial line there are at least two distinct types, as shown by the figures appended. Suppl., Fig. 1, is from a Cotteswold specimen figured as *opalinus*. It has a longer peripheral projection and a rather straighter course on the lateral area than Fig. 2, taken from a Dorset specimen which has hitherto been supposed to be the same species.

FIG. 1.



FIG. 2.

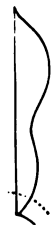


FIG. 3.



FIG. 4.



FIG. 1.—Radial line of *Cypholloceras opaliniforme*.

FIG. 2.—Radial line of *Lioceras opalinum*.

FIG. 3.—Outline of mouth-border of *Cypholloceras opaliniforme*.

FIG. 4.—Outline of mouth-border of *Lioceras aff. partitum*.

Which of these two types agrees with Reinecke's *opalinus* it is impossible to say, for the radial curves in his drawing are obviously incorrect. So far as that matter is concerned Reinecke's figure must be put out of court. It is right, then, to take as type of *opalinus* the next specimen so identified, provided that it otherwise agrees with Reinecke's example. This happens to be Quenstedt's, in 'Ceph.,' pl. vii, fig. 10. It has a radial line agreeing with that of Fig. 2.

This, then, is the position arrived at. *Opalinus* is the type species of *Lioceras*,

and Quenstedt's¹ fig. 10 in pl. vii of his 'Cephalopoden' is regarded as the arbiter of what is *opalinus*.

There is, however, further trouble. The *opalinus* as now identified occurs at a higher horizon—it lived at a later date—than what I regarded, in part, as *opalinus* before, so that the term "*opalinus* beds" must be rejected, and the hemeral nomenclature must be altered in accordance with the present conclusions.

The annexed table gives the strata of the Cotteswolds and of the South Dorset coast, which were deposited during four hemeræ; and it will therefore show the relative dates of *opalinus* and of opalinoid species.

Date.	Stratal succession.	
	COTTESWOLDS.	SOUTH DORSET COAST, generalised.
<i>Murchisonæ</i>	Pea-grit series, with <i>Amm.</i> of the <i>Murchisonæ</i> type.	Ironshot Limestone = the "Wild Bed" of Chideock Quarry, with <i>Amm.</i> of the <i>Murchisonæ</i> type.
<i>Scissi</i>	Sandy ferruginous Limestone with <i>Tmetoceras scissum</i> and <i>Lioceras</i> species.	Bluish-grey Limestone with <i>Tmetoceras scissum</i> and <i>Lioceras</i> species.
<i>Opaliniformis</i>	Hard ironshot Limestone capping the Cephalopod-bed, with opalinoid species = <i>Cypholioceras</i> .	Yellow sands with opalinoid species = <i>Cypholioceras</i> .
<i>Aalensis</i>	Ironshot marly stone of the Cephalopod-bed, with species of the <i>aalense</i> type.	Yellow sands with species of the <i>aalense</i> type.

The genus *Lioceras* and its species may now be considered in detail.

VII. Genus—LIOCERAS, Hyatt.

(Type: LIOCERAS OPALINUM, Reinecke sp.)

1867. LIOCERAS, Hyatt, Foss. Ceph., Bull. Mus. Comp. Zool., p. 101 (pars).

1887. — This Monogr., pp. 12, 21 (pars).

Definition.—Platyleptogyral, angustumbilicate; subdensiseptate, subbrevisangustilobate; laterally flexiradiate; peripherally subanguliradiate, subacutifastigate, parvi-nonsepti-carinate.

History.—See the prefatory remarks, p. xxxiii.

¹ Quenstedt himself confused several species as *opalinus*. In the 'Jura' he figures two forms which show differences of radial curve, and in his 'Schwäbischen Amm.' he depicts not only forms with differences of radial curve, but also lat- and angust-umbilicate examples, all as *opalinus*.

Literature.—Few species of this genus, as it is now restricted, have been figured. The following may be noticed :

- COMPTUS, NAUTILUS, *Reinecke*, *Maris protog.* Naut. et Argon., pl. i, figs. 5, 6.
 COSTULA, AMMONITES, *Dumortier*, *Bassin du Rhône*, iv, pl. li, figs. 1, 2.
 ELEGANS, AMMONITES, *Vacek*, *Ool. Cap San Vigilio*; *Abb. k. k. Geol. Reichs.*, Bd. xii, pl. vii, fig. 17. Somewhat doubtful.
 MEANDRUS, NAUTILUS, *Reinecke*, *Maris protog.* Naut. et Argonautas, pl. i, figs. 3, 4.
 OPALINUS, AMMONITES, *Quenstedt*, *Ceph.*, pl. vii, fig. 10.
 — — — *Der Jura*, pl. xlv, fig. 10. Somewhat doubtful in radial curve.
 — — — *Schwäbischen Amm.*, pl. lv, fig. 1. Somewhat doubtful.
 — COSTOSUS, AMMONITES, *Quenstedt*, *ibid.*, pl. lv, fig. 20.
 OPALINUM, HARPOCERAS, *Wright*, *Monogr. Lias Amm.*, *Pal. Soc.*, pl. lxxx, fig. 4.
 OPALINUS, NAUTILUS, *Reinecke*, *Maris protog.* Naut. et Argon., figs. 1, 2.

Correction.—Nearly all the specimens inscribed as *Lioceras* in the body of this work must be removed from that position.

Specific Characters.—The species to be described in this genus may be divided by their surface ornamentation into the following groups :

A. <i>Costate.</i>	B. <i>Subcostate.</i>	C. <i>Striate.</i>	D. <i>Renovate.</i>
uncinatum	bifidatum	grave	comptum
uncum	undulatum	lineatum	
costosum	pectile	opalinum	
subcostosum	plicatellum	striatum	
gracile	partitum		
	Thompsoni		

A. Species in the costate stage.

1. LIOCERAS UNCINATUM, *S. Buckman*. Suppl., Plate V, figs. 7—11.

- Cf. ? 1874. AMMONITES COSTULA, *Dumortier* (non *Reinecke*), pt. 4, pl. li, figs. 1, 2.
 1885. HILDOCERAS MURCHISONÆ, *Haug*, *Beitr. Monogr. Harpoceras*; *Neues Jahrbuch für Mineral., &c.*, Beil.-Bd. iii, p. 687 (pars ?).

Description.—Platyleptogyral, gradumbilicate, flexicostate.

Distinction.—From *Ammonites costula*, *Dumortier*, less umbilicate and less distantly costate. From *Hildoceras connectens*, *Haug*, less umbilicate, differently ornate; and, so far as can be judged from the figure, *connectens* has a more pronounced peripheral projection of the radii.

Localities and Strata.—Dorset: Burton Bradstock (grey limestone above the

yellow sands); Stoke Knap (sandy grits, about the horizon of *Terebratula infra-oolithica* and *Rhynchonella Stephensi*).

Date of Existence.—*Scissi hemera*.

2. LIOCERAS UNCUM, *S. Buckman*. Suppl., Plate VI, figs. 8—10.

Description.—Platyleptogyral, gradumbilicate, flexi-subparvicostate.

Distinction.—From *uncinatum*, less costate and less umbilicate.

Note.—The costæ are by no means so strongly marked as in *uncinatum*, and they show signs of degeneration when those of that species are well developed.

Locality and Stratum.—Burton Bradstock (in the grey limestone above the yellow sands).

Date of Existence.—*Scissi hemera*.

3. LIOCERAS COSTOSUM (*Quenstedt*). Suppl., Plate VI, figs. 1—4.

1886. AMMONITES OPALINUS COSTOSUS, *Quenstedt*, *Amm. Schwäb. Jura*, pl. lv, fig. 20.

Description.—Platyleptogyral, gradumbilicate, flexi-subparvicostate.

Distinction.—From *uncinatum*, less umbilicate; from *uncum*, umbilicus is slightly larger and less sparsicostate.

Note.—The costæ visible in the umbilicus are closer together and not so large as those of *uncum*.

Localities and Strata.—Dorset: Burton Bradstock, in grey limestone above the sands; Symondsburry, in yellowish-grey limestone with *Tmetoc. scissum*, below *Zeilleria anglica* and *Amm.* of the *Murchisonæ* type.

Date of Existence.—*Scissi hemera*.

4. LIOCERAS SUBCOSTOSUM, *S. Buckman*. Plate XX, figs. 11, 12; Suppl., Plate VI, figs. 5—7.

1889. LUDWIGIA COSTOSA, *This Monogr.*, Pl. xx, figs. 11, 12.

Description.—Platyleptogyral, subgradumbilicate, flexi-subparvicostate, peripherally subacutifastigate.

Distinction.—From *costosum*, less umbilicate and more compressed.

History.—Figured and described in the body of this work as *Ludwigia costosa*, identified with *Am. opalinus costosus*, Quenstedt. But it is distinctly thinner than the preceding species, which is now, with better reason, identified therewith.

Localities and Strata.—Dorset: Burton Bradstock, with the foregoing. Somerset: Stoford, near Yeovil, in a bluish-grey limestone.

Date of Existence.—*Scissi* hemera.

5. *LIOCERAS GRACILE*, *S. Buckman*. Suppl., Plate VI, figs. 11—13.

Description.—Platyleptogyral, subconcaumbilicate, flexi-subparvicostate.

Distinction.—Less umbilicate than any of the foregoing species.

Locality and Stratum.—Burton Bradstock, with the preceding species.

Date of Existence.—*Scissi* hemera.

B. Species which show a costate followed by a striate stage.

They are distinguished from any of the foregoing by the costæ changing to striæ at a fairly early period of growth.

6. *LIOCERAS BIFIDATUM*, *S. Buckman*. Suppl., Plate VII, figs. 1—6.

Description.—Platyleptogyral, gradumbilicate, flexicostate, changing to flexistriate.

Remarks.—The costate stage gives place to a striate stage, in which the ribs are only partially developed. Later the ribs appear only as somewhat irregular wave-like bulgings developed in the middle of the lateral area.

Locality and Stratum.—Burton Bradstock, with the foregoing species.

Date of Existence.—*Scissi* hemera.

7. *LIOCERAS PLICATELLUM*, *S. Buckman*. Suppl., Plate VIII, figs. 10—12;
Suppl., Plate IX, figs. 7—9.

Description.—Platyleptogyral; subconcaumbilicate, becoming excentrumbilicate in adult; flexistriate.

Remarks.—The costate stage gives place at an early date to a striate stage.

Distinction.—The costate stage is shorter, and changes to striate more completely than in *bifidatum*.

Localities and Strata.—Dorset: Burton Bradstock, with the preceding species; Gloucestershire: Stinchcombe, in the sandy ferruginous beds above the Cephalopod-bed; Leckhampton Hill, similarly (Mr. J. F. Walker, F.G.S.).

Date of Existence.—*Scissi* hemera.

8. LIOCERAS UNDULATUM, *S. Buckman*. Suppl., Plate IX, figs. 1—3, and ? figs. 13, 14.

Description.—Platyleptogyral, excentri-gradumbilicate, flexiradiate—costate and striate.

Distinction.—More umbilicate than the two preceding species.

Locality and Stratum.—Burton Bradstock, with the preceding species.

Date of Existence.—*Scissi* hemera.

9. LIOCERAS PLECTILE, *S. Buckman*. Suppl., Plate IX, figs. 10—12.

Description.—Platyleptogyral, excentri-gradumbilicate, flexiradiate—sparsiparvicostate, and striate.

Distinction.—Less umbilicate than *undulatum*. More umbilicate and differently ornate to *plicatellum*.

Locality and Stratum.—Burton Bradstock, with the foregoing species.

Date of Existence.—*Scissi* hemera.

10. LIOCERAS PARTITUM, *S. Buckman*. Plate XIII, fig. 11; Plate XIV, figs. 3, 4; Suppl., Plate IX, figs. 4—6.

1888. LIOCERAS OPALINUM, *var. COMPTUM*, This Monogr., Pl. xiii, fig. 11; Pl. xiv, figs. 3, 4.

Description.—Platyleptogyral, excentri-gradumbilicate, flexistriate, with costæ developed at intervals, but these costæ fail in the adult.

Distinction.—More excentriumbilicate than the other species. From *plectile*, more compressed.

Locality and Stratum.—Dorset: Burton Bradstock, with the other species.

Date of Existence.—*Scissi* hemera.

11. *LIOCERAS THOMPSONI*, *S. Buckman*. Suppl., Plate VII, figs. 13—16.

Cf. ? 1818. *NAUTILUS MÆANDRUS*, *Reinecke*, pl. i, figs. 3, 4.

Description.—Platyleptogyral, subgradumbilicate, flexiradiate—striate and parvicostate.

Distinction.—From *partitum*, thicker, more ornate, and concentumbilicate; from *bifidatum*, less umbilicate, less costate, thicker.

Remarks.—It is just possible that this species may be the *Am. mæandrus* (*Reinecke*); but, considering how very inferior is that author's figure, it seems preferable to definitely give this species a distinct name than to hazard a most speculative identification. If *Reinecke*'s specimens were in existence it would be another matter, but they are not; and the most diverse views have been expressed not only as to the identification of *mæandrus*, but as to what stratum it came from. Thus *Quenstedt* says that the original locality, "Langheim, would indicate the *Ornatus* beds"¹ (Oxford clay); while *Zieten* figures as *mæandrus*² what appears to be *Oxynotoceras oxynotus*, which would be from the Lias. Under these circumstances it is advisable not to attempt any identification of *Reinecke*'s figure.

Accordingly I name this species in compliment to Mr. Beeby Thompson, F.G.S., who has done such good work among the Liassic rocks of Northamptonshire. I am indebted to him for very kindly adding this and several other good Ammonites to my collection.

Localities and Strata.—Northamptonshire: Duston, near Northampton, in the sands of that name. Dorset: Burton Bradstock, with the other species.

Date of Existence.—*Scissi* hemera.

C. Species which have reached the striate stage.

12. *LIOCERAS LINEATUM*, *S. Buckman*. Suppl., Plate VIII, figs. 1—3.

Description.—Platyleptogyral, costati-gradumbilicate, flexistriate.

Note.—The remains of the costate stage may be seen in the bulgings visible in the umbilicus.

Distinction.—The umbilicus is more coarsely costate than in *Thompsoni*.

¹ 'Amm. Schwäb. Jura,' p. 442.

² 'Verstein Württ.,' pl. ix, fig. 6.

Locality and Stratum.—Dorset: Burton Bradstock, in the same bed as the other species.

Date of Existence.—*Scissi hemera*.

13. LIOCKERAS GRAVE, *S. Buckman*. Suppl., Plate VIII, figs. 4—6.

Description.—Platyleptogyral, concavumbilicate, flexistriate.

Distinction.—From all other species by the concavumbilicus.

Locality and Stratum.—Dorset: Burton Bradstock, with the other species.

Date of Existence.—*Scissi hemera*.

14. LIOCERAS OPALINUM (*Reinecke*). Suppl., Plate X, figs. 6—8.

1818. NAUTILUS OPALINUS, *Reinecke*, *Maris Protog.*, figs. 1, 2.

1849. AMMONITES OPALINUS, *Quenstedt*, *Die Ceph.*, pl. vii, fig. 10.¹

Description.—Platyleptogyral, subconcavumbilicate, flexistriate.

Note.—There is a slight fasciation of the radii, giving the test a somewhat wavy appearance.

Distinction.—In umbilication it is most like *grave*, but it is much more compressed than that species. In the matter of ornament there is considerable similarity to *Thompsoni*, but the umbilicus is distinctly smaller, showing practically no gradumbilicate character until excentricity begins. It therefore does not show the small costæ in the umbilical whorls which are noticeable in *Thompsoni*.

Remarks.—Quenstedt's figure is taken as the type for the reasons which have been already stated (p. xxxiv). It is considered as supplementing Reinecke's in the detail of the radial line.

Correction.—The appellation of the specimens called *Lioceras opalinum* in the body of the work must now be altered. (See syn. of other species of this genus, of *Cypholioceras opaliniforme*, &c.)

Locality and Stratum.—Dorset: Burton Bradstock, with the preceding species.

Date of Existence.—*Scissi hemera*.

¹ Of the other figures of platyleptogyral, angustumbilicate, striate Ammonites quoted by the specific name *opalinus* in the synonymy given in this Monograph, p. 35, many are evidently distinct from this genus as now defined on account of the radial line, so far as its course can be judged from the figures, and none probably belong to this species.

15. *LIOCERAS STRIATUM*, *S. Buckman*. Plate XIII, figs. 6, 12; Suppl., Plate X, fig. 10.

1884. *HARPOCERAS OPALINUM*, *Wright*, Monogr. Lias Amm., Pal. Soc., pl. lxxx, fig. 4 (P).

1888. *LIOCERAS OPALINUM*, This Monogr., Pl. xiii, fig. 6.

1888. *LIOCERAS* between *OPALINUM* and *COMPTUM*, Pl. xiii, fig. 12.

Description.—Platyleptogyral, gradumbilicate, flexistriate.

Distinction.—Like *opalinum*, but with a wider umbilicus. The peripheral area is a little less acutely fastigate. There is a similar fasciation to what obtains in *opalinum*, but it is scarcely noticeable in the young shell, which appears simply striate. This appearance distinguishes it from other gradumbilicate species, which are costate in the umbilicus—for instance, *undulatum*, which it resembles in its proportions.

Remarks.—From the figure only I cannot say if Dr. Wright's specimen belongs to this species, or even to this genus; but it agrees in proportions: all depends on the radial line.

Localities and Strata.—Dorset: Burton Bradstock, with the other species. Gloucestershire: Penn Wood, near Stroud (sandy ferruginous limestone); Frocester Hill.

Date of Existence.—*Scissi* hemera.

16. *LIOCERAS* sp. Plate XIV, figs. 1, 2; Suppl., Plate X, fig. 9.

1888. *LIOCERAS OPALINUM*, *var. COMPTUM*, This Monogr., Pl. xiv, figs. 1, 2.

Distinction.—From *opalinum*, by being thicker and having a smaller umbilicus with the excentricity commencing earlier. From *grave*, by a smaller umbilicus.

Locality and Stratum.—Dorset: Burton Bradstock, with the other species.

Date of Existence.—*Scissi* hemera.

D. Species which have reached the renovate stage.

Distinguished from all other species of the genus by the ornament increasing instead of decreasing with growth—a costate stage succeeding a striate stage.

17. *LIOCERAS COMPTUM* (*Reinecke*). Suppl., Plate VII, figs. 7—12.

1818. *NAUTILUS COMPTUS*, *Reinecke*, *Maris protog. Naut. et Argon.*, pl. i, figs. 5, 6.

Description.—Platyleptogyral, subexcentri-angustumbilicate, flexistriate becoming flexicostate; subdensiseptate, subinornatilobate.

Remarks.—The identification of the figured specimens with *Reinecke's comptus* seems to be justifiable. His figure certainly shows a flexistriate shell which is, comparatively with other species of this genus, somewhat latumbilicate, somewhat pachygyral. These comparative characters seem to be very closely approached in the small specimen depicted in Suppl., Pl. VII, figs. 7, 8.

It will be noticed that the identification of *comptum* in the body of the work has now undergone considerable revision. Some of the forms identified therewith are not sufficiently umbilicate, others too thin or too costate.

Localities and Strata.—Dorset: Burton Bradstock, with the foregoing species; Beaminster, in an oolitic limestone.

Date of Existence.—*Scissi hemera*.

By the kindness of Mr. L. Brasil, of Caen, I have seen specimens from Normandy of this genus, as now restricted. They represented the species *uncinatum* and *gracile*; and others were allied to *uncum*, *gracile*, and *costosum*.

VIII. Genus—CYPHOLIOCERAS,¹ *S. Buckman*.

(Type—*Cypholioceras plicatum*, sp. n.)

1887. *LIOCERAS*, This Monogr., pp. 12, 21 (pars).

Definition.—Platyleptogyral, angustumbilicate; subdensiseptate, subbrevilatilobate; laterally flexiradiate; peripherally acutanguliradiate, subacutifastigate, parvi-nonsepti-carinate.

Note.—The definition is drawn up from the type, except the part which refers to the suture-lines; that is taken from a specimen of *C. opaliniforme*, and its suture-line is figured in p. 36 with the appellation *Lioceras opalinum*.

Distinction.—Separable from *Lioceras* as now defined and restricted, by the longer peripheral projection of the radii (see figs. 1, 2, p. xxxiv); also when the outlines of the body-chamber edge of adult specimens of the two genera are compared

¹ *Κυφός*, bent.

it will be seen that the present genus has a distinctly longer peripheral projection—in other words, is more decidedly rostrate—than is *Lioceras*. The woodcuts, figs. 3, 4, p. xxxiv, illustrate the difference in this respect between homœomorphs of the two genera.

History.—Species of this genus, together with species of *Lioceras*, were described as *Lioceras opalinum* in the body of the work, and consequently taken as types of the genus *Lioceras*, p. 21. For remarks thereon see p. xxxiii.

Geological Position.—The striate species of this genus occur in Dorset in the top part of the Yeovil Sands, underneath the limestone with *Tmetoceras*; and in Gloucestershire in the hard ironshot limestone capping the Cephalopod-bed,—that is in bed No. 15, sect. v, p. 43, and No. 4, sect. vi, p. 45, and underneath the sandy ferruginous limestone. (See p. xxxv.)

Remarks.—The genus, of which only a few species are known, presents certain shells comparable to the striate and renovate series of *Lioceras*, which, however, they preceded in point of time. So the species to be now described form part of a series obviously parallel to *Lioceras*, but earlier in date. The likeness of *Cypholioceras* to *Lioceras* has given much trouble in correlation of strata.

1. *CYPHOLIOCERAS? VITIOSUM*, *S. Buckman*. Suppl., Plate V, figs. 1, 2.

Description.—Steno-subleptogyral, latumbilicate; laterally flexicostate; peripherally angulistriate, subtabulate.

Remarks.—The costæ are connate near the edge of the inner margin, forming a short, slightly stouter rib. Only fragments of the body-whorl of this species have been found, and the pieces figured do not therefore belong to the same specimen.

The placing of this species in the genus *Cypholioceras* must be considered as doubtful. It is a possible ancestor of *plicatum*, allowing that increase of the peripheral projection of the radius accompanied increased compression.

Locality and Stratum.—Gloucestershire: Standish Beacon, in marl with *Terebratula haresfieldensis*.¹

Date of Existence.—*Dumortieriæ* hemera.

¹ It is the bed 19 of the section v (p. 44). In this bed the Ammonites are mostly fragmentary and in poor condition. The *Gramm. striatulum* quoted is a mistake for *Dumortieria* (see p. 166).

2. CYPHOLIOCERAS? PIGRUM, *S. Buckman*. Suppl., Plate V, figs. 3, 4.

Description.—Subplaty-subleptogyral, sublatumbilicate; laterally flexicostate; peripherally angulistriate, subtabulate.

Remarks.—The costæ are occasionally connate, as in the last species.

The placing of this species in *Cypholioceras* is doubtful. It would not be the link between *vitiosum* and *plicatum*, but would indicate an incipient departure in another direction.

Distinction.—From *vitiosum*, smaller umbilicus, less prominent costæ.

Locality and Stratum.—With the preceding species. Only fragments of body-whorls have been obtained.

Date of Existence.—*Dumortieria* hemera.

3. CYPHOLIOCERAS PLICATUM, *S. Buckman*. Suppl., Plate VIII, figs. 7, 9.

Description.—Platyleptogyral, costati-gradumbilicate, flexistriate.

Note.—The portions of the whorls visible in the umbilicus show that the species is costate in youth.

Distinction.—The species is exactly comparable with *Lioceras lineatum*, and is almost in the same stage of development. It is separable not only by the radial curve, but by the difference of striation—the striæ are coarse and much more distant.

Locality and Stratum.—Gloucestershire: Haresfield Hill, in the hard bed below the sandy ferruginous beds. See above, p. xxxv.

Date of Existence.—*Opaliniformis* hemera.

4. CYPHOLIOCERAS OPALINIFORME, *S. Buckman*. Plate XIII, figs. 1—3; Plate A, fig. 10; Suppl., Plate X, figs. 1—4.

1888. *LIOCERAS OPALINUM*, This Monogr., Pl. xiii, figs. 1—3; Pl. A, fig. 10; p. 36, fig. 1.

Description.—Platyleptogyral, concavi-excentrumbilicate, flexistriate.

Distinction.—From *plicatum*, by umbilication and ornament, the striæ being much finer. It is exactly comparable with *Lioceras opalinum*; but besides the difference of the radial curve, it may be noticed that the umbilicus is more concave with sides less steeply sloped, and that the striæ are not fasciated.

History.—Figured and described in the body of the work with other platyleptogyral, angustumbilicate species, as *Lioceras opalinum*. A study of the radial

curves points out that small differences in mode of growth and ornamentation cannot be disregarded, and that a separation on the present lines is imperative.

Remarks.—The specimen depicted in Pl. XIII, figs. 1, 2, is a fine shell. It shows distinctly the amount of the overlap of what is called the dorsal fold of the mantle—on the commencement of the ultimate whorl; but this has not been brought out in the drawing.

Locality and Stratum.—Haresfield Hill, with the preceding species.

Date of Existence.—*Opaliniformis* hemera.

Note.—What has been hitherto called *opalini* hemera—the date of the deposition of beds with a species supposed to be *opalinus*—may now be known, to avoid undue change, by the term *opaliniformis* hemera.

5. CYPHOLIOCERAS aff. OPALINIFORME.

1884. HARPOCERAS OPALINUM, *Wright*, Monogr. Lias Amm. Pal. Soc., pl. lxxx, figs. 6—8.

Note.—Wright's figures appear to depict a distinctly stouter specimen than my type of *opaliniforme*. Except for umbilication it is a homœomorph of *Lioceras grave*.

Locality and Stratum.—"Haresfield Hill" (Wright) [and from the same bed as the other species].

6. CYPHOLIOCERAS RENOVATUM, *S. Buckman*. Plate XIV, figs. 7—9; Suppl., Plate X, fig. 5.

1888. LIOCERAS sp. ?, This Monogr., Pl. xiv, figs. 7—9.

Description.—Platyleptogyral, excentri-angustumbilicate, flexistriate changing to flexicostate.

Note.—The central part of the umbilicus is very small, and concave. Then excentricity commences, and soon afterwards there is the change from striæ to costæ.

Distinction.—Quite separable from the other species of the genus by umbilication and ornament. It is a "renovate" species, somewhat comparable to *Lioceras comptum*, so far as change of ornament is concerned, otherwise there is no likeness.

It is very similar to *Lioceras* sp., No. 16, and exact comparison is not easy. In this case, however, there seems to be, in addition to the longer peripheral projection to the radius, a less distinct carina.

Locality and Stratum.—Haresfield Hill, with the preceding species.

Date of Existence.—*Opaliniformis* hemera.

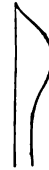
IX. Genus—ANCOLIOCERAS,¹ S. Buckman.(Type—*Ancolioceras substriatum*, sp. n.)

Definition.—Platyleptogyral, angustumbilicate; subdensiseptate, subbrevisublatilobate; laterally subflexiradiate; peripherally acutanguliradiate, subacutifastigate, subalti-nonsepti-carinate.

Distinction.—From *Lioceras*, the radial line is straighter laterally and more projected peripherally; the suture-line has shorter lobes; the carina is more distinctly prominent. From *Cypholioceras*, the radial line is straighter laterally, scarcely so projected peripherally, and the carina is more distinctly separated.

Remarks.—This is a third series of Lioceratoids, occurring at a later date than *Lioceras* or *Cypholioceras*. From them it is distinguishable by slight differences in the curvature of the radial line. Unfortunately the material is scanty, but it is sufficient to indicate that these differences would be associated with another very distinctive feature—an elevated carina.

FIG. 5.—Radial line
of *Ancolioceras*
substriatum.



The scanty material shows that if the series were complete there would be species in three stages of development—tuberculate, costate, costatistriate; and inferentially in a fourth, striate.

Although the species of this genus occur at a later date than *Lioceras* or *Cypholioceras*, yet one of them indicates an earlier stage of development than is seen in either of those genera—the tuberculate stage.

1. ANCOLIOCERAS CARINIFERUM, S. Buckman. Suppl., Plate XI, figs. 7—9.

Description.—Subplatyleptogyral, sublatumbilicate, flexi-subcrassi-costate, bullate, subalticarinata.

Remarks.—The bullæ are placed round the edge of the umbilicus, along the top of the inner margin. A bulla gives rise to two costæ, and there is between two groups of bullicostæ a single costa, which is obsolete in the area where the others join a bulla.

Distinction.—The rather strongly elevated nonsepti-carina forms a particular feature separating this shell from other tuberculate species; and the radial curve must also be considered.

¹ "Αγκος, a bend.

Locality and Stratum.—Dorset: Mapperton, near Beaminster, evidently from near the base of the Inferior Oolite limestone.

Date of Existence.—Murchisonæ hemera.

2. *ANCOLIOCERAS SUBSTRIATUM*, S. Buckman. Suppl., Plate VI, figs. 14—16.

Description.—Platyleptogyral, subconcaumbilicate, laterally subflexicostate passing into substriate.

Remarks.—In the costate stage the ornament is, in design, similar to that of the previous species, only the bulla has lengthened out into a rib. In degree it is less, and it changes rather quickly to what is little more than a striate stage. In this stage there are not the intermittent bulges seen in *Lioceras*. As this species is the homœomorph of *Lioceras bifidatum*, and as *cariniferum* is less developed than *L. uncinatum*, it may be surmised that there are at least three species separating this one from the last—forms corresponding to *uncinatum*, *uncum*, and *gracile*.

Locality and Horizon.—Dorset: Stoke Knap, in the “Bottom Bed,” as the quarrymen term it—the bed below the “Building Stone.”

Date of Existence.—Murchisonæ hemera.

3. *ANCOLIOCERAS?* *COSTATUM*, S. Buckman. Plate VII, fig. 7; Plate A, fig. 11; Suppl., Plate XVII, fig. 30.

1888. *LIOCERAS AMBIGUUM*, var. *COSTATUM*, This Monogr. Pl. vii, fig. 7; 1889, Pl. A, fig. 11.

Description.—Platyleptogyral, excentrumbilicate, parvi-subdensi-flexicostate.

Note.—In connection with the excentrumbilication the periphery becomes broader, more rounded, and less carinate.

Remarks.—The radial curve is similar to that of *Ancol. cariniferum* and *substriatum*, there being a rather long peripheral projection. There are, however, differences in points of detail in regard to the radial curve, costation, mode of growth, &c., which make the generic association doubtful.

Distinction.—From *substriatum*, character of costation, absence of striate stage.

Locality and Stratum.—Somerset: Haselbury, near Crewkerne, in the beds of the “lower division.”¹

¹ See Hudleston, ‘Monogr. Gasteropoda,’ p. 41. The species is probably from the first or second bed of the lower division.

Date of Existence.—*Bradfordensis*, or *Murchisonæ* hemera.

In the neighbourhood of Crewkerne there are several other species more or less allied to the last, and they seem to be somewhat peculiar to that district. Their preservation is too often inferior.


X. Genus—ASTHENOCERAS,¹ S. Buckman.

(Type—*Asthenoceras nannodes*, S. Buckman.)

Definition.—Stenoleptogyral, latumbilicate; laterally flexiradiate; peripherally anguliradiate, subfastigate, alti-septicarinata.

Distinction.—The thin whorls associated with a wide umbilicus and a septicarina distinguish this genus from any one described in this Supplement.

FIG. 6.—Radial line
of *Asthenoceras*
nannodes.



Remarks.—The strong carination and the curvature of the radius may suggest affinity with *Ancolioceras*; but the wide umbilicus and the paucity of ornament forbid direct connection with *Anc. cariniferum*.

1. ASTHENOCERAS NANNODES, S. Buckman. Plate XXXIII, figs. 13—16; Suppl., Plate XI, fig. 28.

1890. GRAMMOCERAS NANNODES, This Monogr., Pl. xxxiii, figs. 13—16.

Remarks.—The radial curve is depicted in fig. 6 above, and also in Suppl., Pl. XI, fig. 28.

Date of Existence.—*Murchisonæ* hemera.

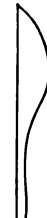
XI. Genus—CYLICOCERAS, S. Buckman.

(Type—*Cylicoceras undatum*, sp. n.)

Definition.—Platy-subpachygyral, subangustumbilicate, laterally subflexiradiate, peripherally obtusanguliradiate, subfastigate, non-septi-carinate.

Distinction.—From *Lioceras*, radial line—the peripheral projection is shorter: mode of growth—thicker in proportion to umbilication, periphery less acutely fastigate.

FIG. 7.—Radial
line of
Cylicoceras
undatum.



¹ 'Ασθενής, without strength, feeble.

1. CYLICOCERAS ENDATUM, *S. Buckman*. Suppl., Plate V, figs. 5, 6.

Description.—Given under genus; substitute costate for radiate.

Locality and Stratum.—Gloucestershire: Haresfield Hill (Bed 15 of Section v, p. 43).

Date of Existence.—*Opaliniformis* hemera.

XII. Genus—GEYERIA,¹ *S. Buckman*.

(Type—*Geyeria fasciata*, sp. n.)

Definition.—Platyleptogyral, subangustumbilicate; denseptate, subbrevisangustilobate; laterally flexiradiate; peripherally anguliradiate, subtabulate, parvi-nonsepti-carinate.

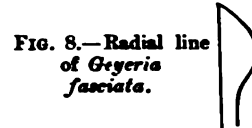


FIG. 8.—Radial line of *Geyeria fasciata*.

Distinction.—From *Lioceras* or *Cypholioceras*, greater densiseptation and the subtabulate periphery. From *Lioceras* or *Cylicoceras*, a difference of rib flexure—the longer peripheral projection; and from the latter, too, mode of growth—the greater compression proportionate to umbilication.

1. GEYERIA FASCIATA, *S. Buckman*. Suppl., Plate VI, figs. 17—19.

Description.—Platyleptogyral, subangustumbilicate, flexi-connaticostate.

Locality and Stratum.—Dorset: Sherborne, in a greyish sandy matrix, not far above the Yeovil sands.

Date of Existence.—*Murchisonæ*, or possibly *scissi* hemera.

The following species has some resemblance, but it seems scarcely to be a *Geyeria*. The radial curve is more biarcuate, also there are characters of pauciseptation, brevilobation, and less compression.

2. GEYERIA? EVERTENS, *S. Buckman*. Suppl., Plate XI, figs. 10—12.

Description.—Platy-subleptogyral, sublatumbilicate; subparvicostate; periphery subfastigate, changing to subconvex, parvi-subacuticarinata.



FIG. 9.—Radial line of *Geyeria? evertens*.

¹ In honour of Dr. G. Geyer.

Note.—This is a very interesting species because, though the costæ are present, there are some obvious gerontic characters, namely, incipient excentrumbilication, correlated slight inflation of whorl, greater convexity of periphery, decay of carina, and shortening of rostration as shown by radial lines. The character of the septa may also be gerontic.

Locality and Stratum.—Dorset: Mapperton, near Beaminster, in a whitish stone, near base of limestone beds.

Date of Existence.—*Scissi* or *Murchisonæ* hemera.

XIII. Genus—WELSCHIA,¹ S. Buckman.

(Type—*Welschia obtusiformis*,² sp. n.)

Definition.—Platy-subpachygyral, angustumbilicate; subdensisepate, sublongi-angustilobate; laterally subflexiradiate; peripherally subanguliradiate, subconvexi-fastigate, parvi-nonsepticarinata.

Distinction.—From *Cylicoceras*, the radial line is more curved and slightly more peripherally projected; the mode of growth is different—a small umbilicus is associated with thicker whorls, and the periphery is more tabulate.



FIG. 10.—Radial line of *Welschia obtusiformis*.

1. WELSCHIA OBTUSIFORMIS, S. Buckman. Plate I; Suppl., Plates IV, fig. 19; and XII, figs. 1—3 a (Type).

1887. LUDWIGIA MURCHISONÆ, This Monogr., Pl. i.

Description.—Platy-subpachygyral, angusti-gradumbilicate, costate.

Notes.—The large specimen, Pl. I, is just a trifle more umbilicate than the small one. Owing to its preservation it has been very difficult to trace its radial curve. The result given in Suppl., Pl. IV, fig. 19, may not be exactly accurate.

Mr. C. Upton has shown me a specimen from Chideock identifiable with this species, and about the size of the figured type; but it possesses only small costæ in the inner whorls. It is, perhaps, a case of temporary arrested development in youth.

¹ In honour of M. Jules Welsch.

² The type specimen of the genus is the one figured Suppl., Pl. XII, figs. 1—3.

Localities and Strata.—Dorset: Chideock Quarry Hill, in the Wild Bed; Bradford Abbas, in the Paving Bed.

Date of Existence.—*Murchisonæ* hemera.

2. *WELSCHIA RUSTICA*, *S. Buckman*. Suppl., Plate IV, figs. 16—18.

Description.—Platy-subpachygyral, angusti-gradumbilicate, parvicostate, subfastigate.

Distinction.—From *obtusiformis*, greater compression and less coarse ornament, particularly in the umbilicus. The periphery is more acutely fastigate. There is a slight difference in the radial curve.

Localities and Strata.—Dorset: Stoke Knap, near Broad Windsor, from the Building Stone; Louse Hill, near Sherborne, from the *ringens* bed, by matrix.

Date of Existence.—*Bradfordensis* hemera.

3. *WELSCHIA PAGANA*, *S. Buckman*. Plate XII, figs. 5—7; Suppl., Plate XI, fig. 32.

1888. *LIOCERAS BRADFORDENSE*, *var. GIGANTEUM*, This Monogr., Pl. xii, figs. 5—7.

Description.—Platy-subleptogyral, subgradumbilicate, parvicostate.

Note.—The last few ribs in this specimen are shown rather too coarsely.

Distinction.—From *rustica* smaller costæ.

Locality and Stratum.—Dorset: Stoke Knap in the Building Stone.

Date of Existence.—*Bradfordensis* hemera, presumably.

XIV. Genus—*COSMOGYRIA*,¹ *S. Buckman*.

(Type—*Cosmogyrta obtusa*,² Quenstedt, sp.)

Definition.—Platy-subpachygyral, angustumbilicate; subpaucisepate, longi-angustilobate; laterally subflexiradiate; peripherally subanguliradiate, tabulate, parvi-nonsepti-carinate.

¹ *Κόσμος*, ornament; *γῦρος*, a whorl.

² In case fault should be found with the identification, I select as the type of the genus the specimen now figured, Suppl., Pl. IV, figs. 10—12.

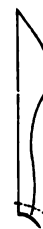


FIG. 11.—Radial line of *Cosmogyrta obtusa*.

Distinction.—From *Welschia*, the suture-line has longer and narrower lobes, the periphery is more tabulate, and the ornament is coarser.

1. COSMOGYRIA OBTUSA (*Quenstedt*). Suppl., Plate IV, figs. 10—12 d.

1849. AMMONITES MURCHISONÆ OBTUSUS, *Quenstedt*, Ceph., pl. vii, fig. 12.

Description.—Platy - subpachygyral, angustumbilicate, subcrassi - subpaucicostate.

Remarks.—The distinctive features of *Quenstedt*'s figure are—stout whorls and a small umbilicus, costæ almost straight across the lateral area, fairly large and somewhat distant, a very distinctly flattened periphery wherein the carina seems a trifle sunk, a rather long and narrow superior lateral lobe. It seems that the specimen now figured agrees with *Quenstedt*'s delineation in all these details.

Although so like *obtusiformis* in its general appearance and proportions, yet as the degree of ornamentation and the shape of the periphery are different, it cannot be the same species; and as the suture-line is certainly different, while the radial line is somewhat so, it cannot be placed in the same genus.

Locality and Stratum.—Somerset: Dundry Hill, the west end, from a rather hard, greyish-brown ironshot limestone.

Date of Existence.—*Murchisonæ* hemera, probably.

2. COSMOGYRIA SUBTABULATA, *S. Buckman*. Suppl., Plate IV, figs. 13—15 b.

Description.—Platy - subpachygyral, gradumbilicate, subcrassicostate, periphery subtabulate.

Distinction.—From *obtusa*, a more concentric umbilicus, more numerous and more elevated costæ, a broad and more tabulate periphery.

Locality and Stratum.—Dorset: Chideock Quarry Hill, from what the workmen call the "Building Stone" or the "Red Beds."

Date of Existence.—*Bradfordensis* hemera.

3. *COSMOGYRIA* sp. Suppl., Plate XIV, figs. 11, 12.

The small specimen figured is not the young of any species which has been described.

The radial line seems to indicate its position in this genus.

Locality and Stratum.—Dorset: Chideock Hill, in the "Wild Bed."

Date of Existence.—*Murchisonæ* hemera.

In the following species the character of the suture-line agrees with that of this genus; and so do the proportions in the case of the first. But the radial line differs,—there is more lateral curvature.

4. *COSMOGYRIA*? *MAGGI*,¹ *S. Buckman*. Suppl., Plate X, figs. 23—25 (Type), and figs. 26—28.

Description.—Platy-subleptogyral, excentri-concavumbilicate, striate.

Localities and Stratum.—Dorset: Sherborne, two specimens from the Collection of Mr. T. C. Maggs, F.G.S., and one from my father's Collection, from the *Rhynchonella ringens* bed; Louse Hill, near Halfway House.

Date of Existence.—*Bradfordensis* hemera.

5. *COSMOGYRIA*? *CIRRATA*, *S. Buckman*. Suppl., Plate X, figs. 32—34.

Description.—Platyleptogyral, gradumbilicate, striate.

Distinction.—From *Maggi* greater compression, more excentric umbilicus.

Locality and Stratum.—Dorset: Halfway House, probably from the *Rhynchonella ringens* bed.

Date of Existence.—*Bradfordensis* hemera, probably.

¹ In compliment to Mr. T. C. Maggs, F.G.S.

XV. Genus—HYATTIA,¹ S. Buckman.(Type: *Hyattia pustulifera*, sp. n.)

Definition.—Platy-subpachygyral, subangustumbilicate; subpauciseptate, sublongi-angustilobate; laterally subflexiradiate; peripherally anguliradiate, planifastigate, parvi-nonsepti-carinate.

Distinction.—From *Welschia*, greater proportionate umbilication, a more planifastigate periphery.

Note.—The periphery is more definitely separated from the lateral area than in *Welschia*.

FIG. 12.—Radial line of *Hyattia pustulifera*.

1. HYATTIA BULLIFERA, S. Buckman. Suppl., Plate XIV, figs. 1, 2.

1886. AMMONITES MURCHISONÆ OBTUSUS, *Quenstedt*, Amm. Schwäb. Jura, pl. lviii, fig. 10.

Description.—Substeno-subpachygyral, latumbilicate, irregulari-bullicostate.

Note.—The description is taken from what is presumed to be a young shell, and so the proportions would alter very much with age.

The bullæ rise prominently above the inner margin, and send forth two or three costæ. There are costæ also between the bullæ, so that of about five costæ two are plain, and three are united into a bulla.

Localities and Strata.—Gloucestershire, from the Pea Grit of the Cheltenham neighbourhood, probably from Birdlip. Foreign: Normandy, Feuguerolles, “*Murchisonæ* bed” (M. L. Brasil).

Date of Existence.—*Murchisonæ* hemera.

2. HYATTIA PUSTULIFERA, S. Buckman. Suppl., Plate XIII, figs. 1—3.

Description.—Platy-subpachygyral, subangustumbilicate; costate, in youth irregulari-bullicostate.

Distinction.—It is not the adult of *bullifera*, because the bullicostæ are much less pronounced.

Locality and Stratum.—Dorset: Chideock Quarry Hill, in the “Wild Bed.”

Date of Existence.—*Murchisonæ* hemera.

¹ In compliment to Prof. Alpheus Hyatt.

3. *HYATTIA WILSONI*, S. Buckman. Suppl., Plate XII, figs. 4—9.

Description.—Platyleptogyral, gradumbilicate; costate declining to striate; periphery fastigate, parvicarinate.

Distinction.—From *pustulifera*, decline of ornament.

It may be compared with *Am. Murchisonæ*, Zieten,¹ which was made a species by Mayer under the name *opalinoides*. But in the present species the suture-lines are more ornate and more lobate, the specimens are more coarsely costate, rather thicker, and less acuti-fastigate.

Remarks.—Greatly do I regret to say that since the name was given to this species, and the description written, the friend to whom it was dedicated as a reminiscence of our joint work at Dundry is deceased. I allude to the late E. Wilson, F.G.S., the former curator of the Bristol Museum. I am indebted to him in very many ways; and through the keen interest which he took in this work I have derived the greatest assistance in the way of interesting material.

Localities and Strata.—Dorset: Chideock Quarry Hill, in the "Wild Bed;" Somerset: Dundry Hill, probably from the hard, irony bed.

Date of Existence.—*Murchisonæ* hemera.

4. *HYATTIA SUBCAVA*, S. Buckman. Woodcut Fig. 13 in text.

Description.—Platyleptogyral, parvigradumbilicate, subcostate declining to striate, periphery fastigate, parvicarinate.

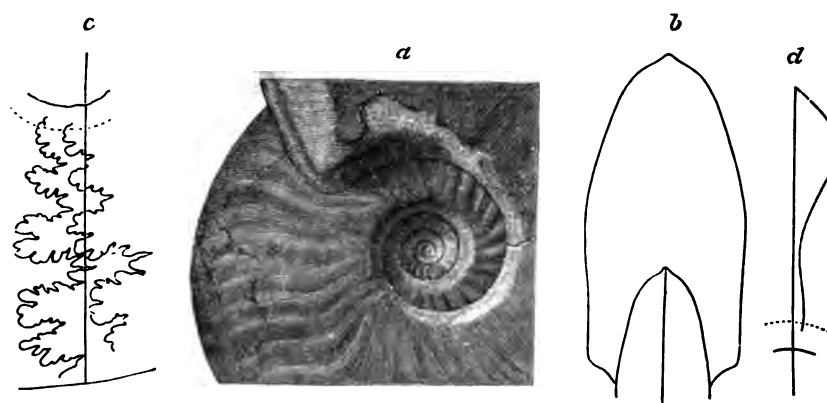


FIG. 13.—*Hyattia subcava*, S. Buckman. Paving Bed, Bradford Abbas, Dorset. *a*, side view; *b*, whorl-section; *c*, suture-lines; *d*, radial curve.

¹ Verstein, Württ., Pl. vi, fig. 1 only.

Note.—Costæ give way to striæ at a diameter of about 75 mm.

Distinction.—From *Wilsoni*, smaller umbilicus, earlier failure of costæ.

Locality and Stratum.—Dorset : Bradford Abbas, and by matrix certainly from Paving Bed.

Date of Existence.—*Bradfordensis*, or *Murchisonæ* hemera.

XVI. Genus—HYATTINA, S. Buckman.

(Type—*Hyattina Brasili*, sp. n.)

Definition.—Platyleptogyral, angustumbilicate; subdensiseptate, brevi-angustilobate; laterally subflexiradiate; peripherally anguliradiate, subtabulate, parvi-nonsepti-carinate.

Remarks.—There is but little curvature in the course of the costæ on the lateral area. Other noticeable features in combination therewith are the small umbilicus, the compression, the subtabulate periphery, and the short, narrow lobes of the suture-line.

Distinction.—From the genera which it resembles in the course of the radial line, it is distinguished by the combination of characters noticed above. The brevi-angustilobate, densiseptate character of the suture-line is, perhaps, most distinctive.



FIG. 14.—Radial line of *Hyattina Brasili*.

1. HYATTINA BRASILI, S. Buckman. Suppl., Plate XIII, figs. 7—9.

Description.—Platyleptogyral, angustumbilicate, costate; periphery subtabulate.

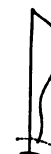
Localities and Strata.—Somerset : Haselbury, near Crewkerne, from the “lower beds.” Foreign : Normandy (Calvados), Feuguerolles, two specimens (one from M. L. Brasil, labelled “*Murchisonæ* beds”).

Date of Existence.—*Murchisonæ* hemera.

XVII. Genus—MANSELIA,¹ S. Buckman.(Type—*Manselia subfalcata*, sp. n.)

Definition.—Platyleptogyral, angustumbilicate; subdensiseptate, sublongi-subangusti-lobate; laterally subflexiradiate; peripherally anguliradiate, subacutifastigate, parvi-nonsepti-carinate.

Distinction.—From *Ancolioceras*, the radial line has less peripheral projection; the suture-line has longer, somewhat narrower lobes. From *Hyattina*, the more acute periphery, and the longer lobes of the suture-line. From *Hyattia*, greater compression.

FIG. 15.—Radial line of *Manselia subfalcata*.

1. MANSELIA SUBACUTA, S. Buckman. Suppl., Plate XIII, figs. 4—6.

Description.—Platyleptogyral, gradumbilicate, subparvi-costate.

Remarks.—A doubt may be expressed whether this species is correctly assigned to a genus, whereof *subfalcata* is the type. The costation is of a coarser character, and the lobes of the suture-line seem to be shorter in proportion.

Localities and Strata.—Dorset: Symondsburry, near Bridport, from a yellowish sandy matrix—a similar bed contains *Zeilleria anglica*; Bradford Abbas, from the Paving Bed.

Date of Existence.—*Murchisonæ hemera*.

2. MANSELIA SUBFALCATA, S. Buckman. Suppl., Plate XI, figs. 25—27.

Description.—Platyleptogyral, gradumbilicate, parvicostate.

Distinction.—There is some likeness to *Am. Murchisonæ falcatus*, Quenstedt, but that shell has a more tabulate, more distinctly carinate periphery. From *subacuta*, less coarse ornament.

Localities and Strata.—Dorset: Halfway House, near Sherborne, from a greyish limestone, evidently the bed just above the Sands.² Gloucestershire: Leckhampton Hill, from the Pea Grit, or Lower Freestone.

Date of Existence.—*Murchisonæ hemera*.

¹ In compliment to Mr. J. C. Mansel-Pleydell, F.L.S., F.G.S., President of the Dorset Natural History and Antiquarian Field Club.

² "Bajocian Sherborne District," 'Quart. Journ. Geol. Soc.,' vol. xlix, p. 486, sect. 4, Bed 11.

3. *MANSELIA TRICHINA*, *S. Buckman*. Suppl., Plate X, figs. 14—16.

Description.—Platyleptogyral, subconcavumbilicate, subcostate to striate.

Distinction.—From the other species by the character of the ornament.

Localities and Strata.—Dorset : Horn Park, near Beaminster, from a greyish matrix, evidently below the ironshot; Bradford Abbas, Paving Bed. And a slightly more costate specimen, Normandy : Feuguerolles, “Murchisonæ, upper part” (M. L. Brasil).

Date of Existence.—*Murchisonæ* hemera.

A species possibly to be assigned to this genus is—

1886. *AMMONITES MURCHISONÆ ACUTUS*, *Quenstedt*. *Amm. Schwäb. Jura*, pl. lix, fig. 3.

Its position would be between *subfalcata* and *trichina*.

XVIII. Genus—*APEDOGYRIA*,¹ *S. Buckman*.

(Type—*Apedogyria patellaria*, sp. n.)

Definition.—Subplatyleptogyral, latumbilicate; subdensiseptate, subbrevisublati-lobate; laterally flexiradiate; peripherally sub-anguliradiate, subtabulate, parvi-nonsepti-carinate.

Distinction.—Much compressed like the last two genera, but more umbilicate. From *Hyattina*, the shorter, broader lobes of the suture-line form an excellent distinguishing character.



FIG. 16.—Radial line of *Apedogyria patellaria*.

1. *APEDOGYRIA PATELLARIA*, *S. Buckman*. Suppl., Plate XIV, figs. 3—5.

1878. *LUDWIGIA MURCHISONÆ*, *Bayle*. *Explic. carte géol. France*, pl. lxxxv, fig. 3, only.

Description.—Subplatyleptogyral, latumbilicate; costate declining to striate; periphery subtabulate.

Remarks.—The flat sides of the whorls and the slight increase in thickness give this species a peculiar plate-like appearance.

Localities and Strata.—Dorset : Chideock Hill, from the “Wild Bed;” Marston Road, near Sherborne, probably from below the *ringens* bed. Foreign : Normandy, Feuguerolles. Bayles specimen is from “Lias supérieur, Éterville (Calvados).”

Date of Existence.—*Murchisonæ* hemera.

¹ *Ἀπιδύς, level, flat; γῦρος, a whorl.

2. *APEDOGYRIA PLATYCHORA*,¹ *S. Buckman*. Plate V; Plate IV, fig. 8; Suppl., Plate XI, fig. 33.

1887. *LIOCERAS BRADFORDENSE*, *This Monogr.*, Pl. v; Pl. iv, fig. 8 only.

Description.—Platyleptogyral, excentri-gradumbilicate, parvi-subobsoleticostate.

Distinction.—From *patellaria*, less costation.

Localities and Strata.—Dorset: Horn Park, Beaminster, from the ironshot bed; Stoke Knap, from the Building Stone; Chideock, from base of Building Stone.

Date of Existence.—*Bradfordensis* hemera.

3. *APEDOGYRIA*? *SUBCORNUA*, *S. Buckman*. Suppl., Plate XIV, figs. 13—15.

Description.—Platyleptogyral, excentri-gradumbilicate, subdensiseptate, brevisangustilobate, densi-parvi-costate.

Notes.—The periphery is very narrow and subfastigate. Accompanying the excentrumbilicatum there is a slight increase in progressive thickness of whorl. The mouth-border has short (incomplete) lateral lappets; hence the specific name.

Remarks.—The generic position is not quite satisfactory, though there is fair agreement in radial and suture-lines.

Distinction.—From *platychora*, costæ smaller and more numerous, different umbilication.

There is a similarity to *Am. Murchisonæ intralævis*. Quenstedt,² except in the costation, which, in this fossil, is more angulate.

Localities and Strata.—Dorset: Horn Park, near Beaminster, in the lower, not ironshot, beds, about the horizon of *Zeilleria anglica* (Oppel); Chideock, top of "Wild Bed" or base of Building Stone; Somerset: Stoford, from a grey limestone.

Date of Existence.—*Murchisonæ* hemera.

¹ Πλατύχωρος, with a broad place or space.

² 'Schwäb. Amm.', pl. lix, fig. 10.

XIX. Genus—LUDWIGINA, S. Buckman.

(Type—*Ludwigina patula*, sp. n.).

1887. LUDWIGIA (pars), This Monogr., p. 16.

Definition.—Substeno-leptogyral, latumbilicate; pauciseptate, sublongi-subangustilobate; laterally flexiradiate; peripherally anguliradiate, subtabulate, parvi-nonsepti-carinate.

Distinction.—Similar to *Apedogyria*, but more umbilicate.

Remarks.—The radial curves in this and the last genus are practically the same. But *Ludwigina patula* and *Apedogyria patellaria* are in the same degree of development. The degree of costation and compression is similar, but the umbilicus associated therewith is much larger in the present genus.

FIG. 17.—Radial line of *Ludwigina patula*.

1. LUDWIGINA PATULA, S. Buckman. Plate III, fig. 3; Suppl., Plate XIV, figs. 7, 8.

1887. LUDWIGIA MURCHISONÆ, This Monogr., Pl. iii, fig. 3 only.

Description.—Substenoleptogyral, latumbilicate; costate.

Localities and Strata.—Dorset: Louse Hill, near Halfway House; Bradford Abbas, in the Paving Bed; Marston Road, near Sherborne, probably from below the *ringens* horizon.

Date of Existence.—*Murchisonæ* hemera.

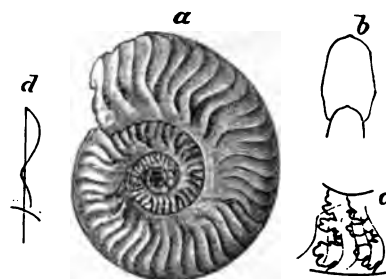
2. LUDWIGINA UMBILICATA, S. Buckman. Woodcut Fig. 18 in text.

Description.—Subplaty-leptogyral, latumbilicate; subparvicostate.

Distinction.—From *patula*, less coarse costation, smaller umbilicus, greater compression. And the small *patula* (Suppl., Plate XIV, figs. 7, 8) shows rather more angustilobation than Fig. 18, c.

Locality and Stratum.—Dorset: Bradford Abbas, in the Paving Bed.

Date of Existence.—*Murchisonæ* hemera.

FIG. 18.—*Ludwigina umbilicata*.
a, side view; b, section; c, suture-line;
d, radial line.

XX. Genus—STROPHOGYRIA,¹ *S. Buckman.*

(Type—*Strophogyria cosmia*, sp. n.)

Definition.—Substeno-subleptogyral, latumbilicate; subdensiseptate, subbrevisublatilobate; laterally subflexiradiate; peripherally anguliradiate, tabulate, parvi-nonsepti-carinate.

Distinction.—From *Ludwigina*, umbilication is rather less proportionately to development of other characters, compression is less, and periphery is tabulate.

1. STROPHOGYRIA AGRIA, *S. Buckman.* Woodcut Fig. 19 in text.

Description.—Substeno-leptogyral, latumbilicate; subcrassicostate; periphery tabulate, almost sulcate.

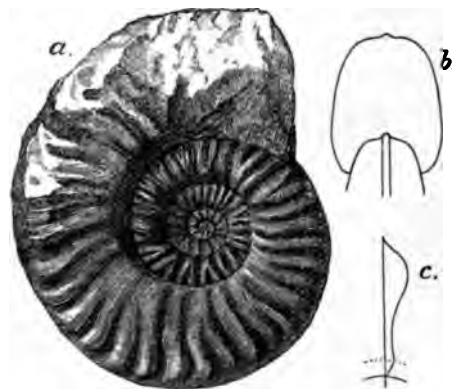


FIG. 19.—*Strophogyria agria*; a, side view; b, section; c, radial line.

Locality and Stratum.—Dorset: Bradford Abbas, apparently from the Paving Bed.

Date of Existence.—*Murchisonæ hemera.*

2. STROPHOGYRIA COSMIA, *S. Buckman.* Woodcut Fig. 20 in text.

Description.—Subplaty-subleptogyral, sublatumbilicate, costate; periphery tabulate, almost sulcate.

¹ Στροφή, a band.

Distinction.—From *agria*, less umbilicate and more compressed.

Localities and Strata.—Dorset: Mapperton, near Beaminster, from a whitish stone; Bradford Abbas, Paying Bed; and a near ally, Chideock, top of “Wild Bed,” by matrix (C. Upton).

Date of Existence.—*Murchisonæ* hemera.

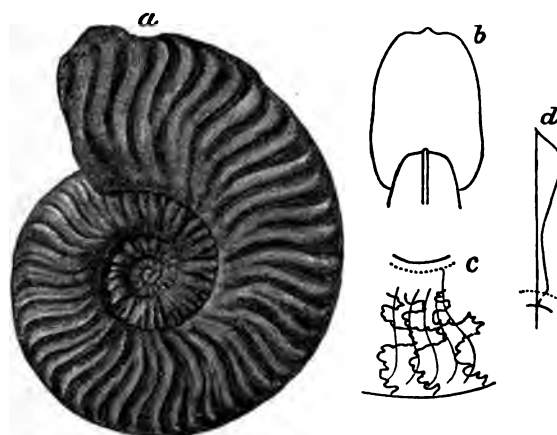


FIG. 20.—*Strophogyria cosmia*: *a*, side view; *b*, section; *c*, suture-line; *d*, radial line. Mapperton.

3. STROPHOGYRIA PINAX, *S. Buckman*. Plate II, figs. 3, 4; Woodcut Fig. 21 in text.

1887. LUDWIGIA MURCHISONÆ, This Monogr., Pl. ii, figs. 3, 4.

Description.—Platyleptogyral, angustumbilicate; subparvicostate, declining to striate; periphery subtabulate.

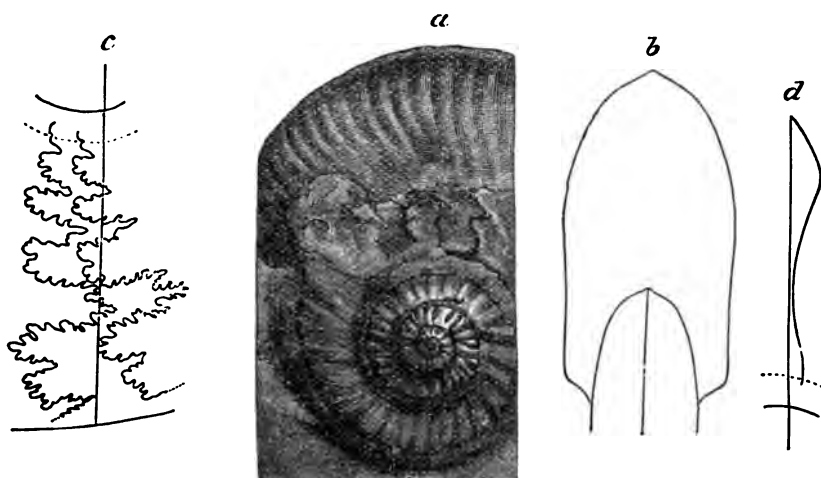


FIG. 21.—*Strophogyria pinax*: *a*, side view; *b*, whorl section; *c*, suture-lines; *d*, radial line. Broad Windsor, Dorset.

SUPPLEMENT, PLATE V.

Dumortierix hemera.

Figs. 1, 2.—*CYPHOLIOCERAS* ? *VITOSUM*, *S. Buckman.*

Fig. 1.—Portions of two specimens. These fragments are placed according to the position they would apparently occupy in a complete shell, which is outlined by dots. Standish Beacon. My Collection. (Page xlv.)

Fig. 2.—View of the peripheral area. 2 *a.*—Outline of the whorl-section. 2 *b.*—Radial curve.

Figs. 3, 4.—*CYPHOLIOCERAS* ? *PIGRUM*, *S. Buckman.*

Fig. 3.—Side view of a fragment. Standish Beacon. My Collection. (Page xlv.)

Fig. 4.—Outline of the whorl-section. 4 *a.*—Radial curve.

Opaliniformis hemera.

Figs. 5, 6.—*CYLIOCERAS* *UNDATUM*, *S. Buckman.*

Fig. 5.—Side view of a somewhat ill-preserved specimen, the test mostly replaced by a film of iron oxide. Haresfield Hill. My Collection. (Bed 15, section v, p. 43.) (Page l.)

Fig. 6.—Outline of the whorl-section. 6 *a.*—Radial curve.

*Scissi hemera.*¹

Figs. 7—11.—*LIOCERAS* *UNCINATUM*, *S. Buckman.*

Fig. 7.—Side view of a very well-preserved specimen, with most of its test present. Burton Bradstock. Collected by Mr. Darell Stephens, F.G.S. Now in my cabinet. (Page xxxvi.)

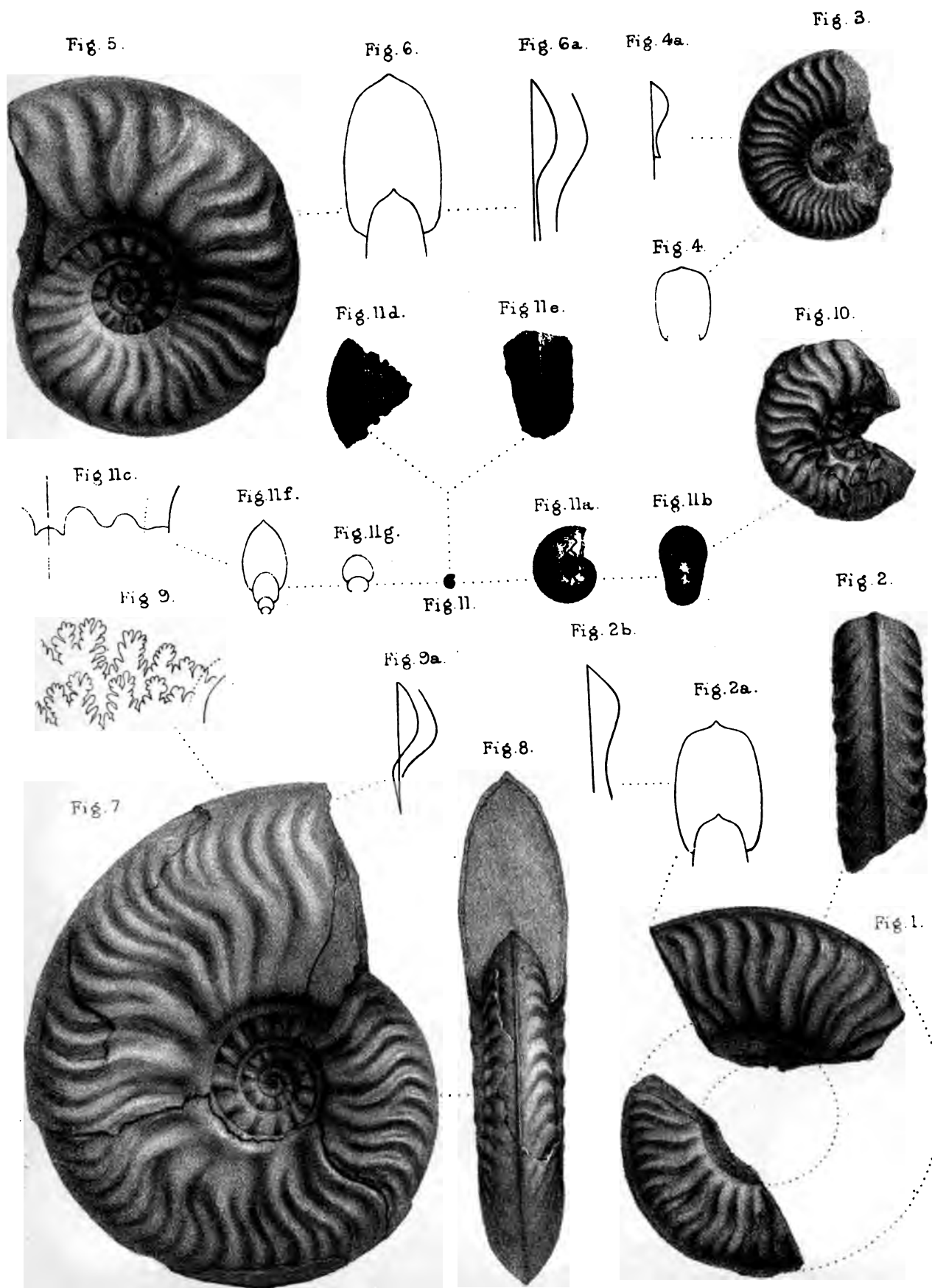
Fig. 8.—View of whorl-section and peripheral area, from part of which the test is absent.

Fig. 9.—Suture-line. 9 *a.*—Radial curve.

Fig. 10.—Side view of a young specimen broken up to furnish material for figs. 11—11 *g.* Burton Bradstock. Mr. Darell Stephens.

Fig. 11.—Side view of the first whorl broken out of the specimen shown in fig. 10. 11 *a.*—Front view $\times 6$. 11 *b.*—Peripheral view. 11 *c.*—Suture-line, enlarged. 11 *d.*—Side view of the third whorl embracing part of the second whorl. 11 *e.*—Peripheral view showing incipient carina. 11 *f.*—Outline of the sections of whorls 2, 3, 4, 5, to show the change in shape and in amount of inclusion; the bottom whorl (2) fits to the end of 11 *a.* 11 *g.*—The whorls 2 and 3 of 11 *f* enlarged twice.

¹ The date in the case of these Burton Bradstock species is known by the matrix.



SUPPLEMENT, PLATE VI.

Scissi hemera.

Figs. 1—4.—*LIOCERAS COSTOSUM* (*Quenstedt*).

Fig. 1.—Side view of an immature specimen without much test. Burton Bradstock. From the collection of Mr. Darell Stephens, F.G.S. Now in my Cabinet. (Page xxxvii.)

Fig. 2.—Peripheral view.

Fig. 3.—Outline of the whorl-section.

Fig. 4.—Part of suture-line. 4 *a*.—Radial curve.

Figs. 5—7.—*LIOCERAS SUBCOSTOSUM*, *S. Buckman*.

Fig. 5.—Side view of a wholly septate specimen, without test. It is labelled "Stoford," but the matrix seems to indicate Burton Bradstock. The specimen was probably obtained from a working collector. My Collection. (Page xxxvii.)

Fig. 6.—Front view.

Fig. 7.—Suture line. 7 *a*.—Radial curve.

(For other figures of this species see Pl. XX, figs. 11, 12, under the name "*Ludwigia costosa*," which should now be altered.)

Figs. 8—10.—*LIOCERAS UNCUM*, *S. Buckman*.

Fig. 8.—Side view of a wholly septate, partially testate specimen. Burton Bradstock. From the collection of Mr. Darell Stephens, F.G.S. Now in my Cabinet. (Page xxxvii.)

Fig. 9.—Front view.

Fig. 10.—Suture-lines. 10 *a*, 10 *b*.—Radial curves.

Figs. 11—13.—*LIOCERAS GRACILE*, *S. Buckman*.

Fig. 11.—Side view of a mostly testate specimen. Burton Bradstock. From the Collection of Mr. Darell Stephens, F.G.S. Now in my Cabinet. (Page xxxviii.)

Fig. 12.—Front view.

Fig. 13.—Suture line. 13 *a*.—Radial curve.

Murchisonæ hemera.

Figs. 14—16.—*ANCOLIOCERAS SUBSTRIATUM*, *S. Buckman*.

Fig. 14.—Side view of a wholly septate, partially testate specimen, showing costæ passing into somewhat fine striæ. From the "BOTTOM BED" at Stoke Knap, near Broad Windsor, Dorset. My Collection. (Page xlviii.)

Fig. 15.—Front view.

Fig. 16.—Suture-lines. 16 *a*.—Radial curve taken from where the costæ are present. 16 *b*.—Another taken where striæ are developed.

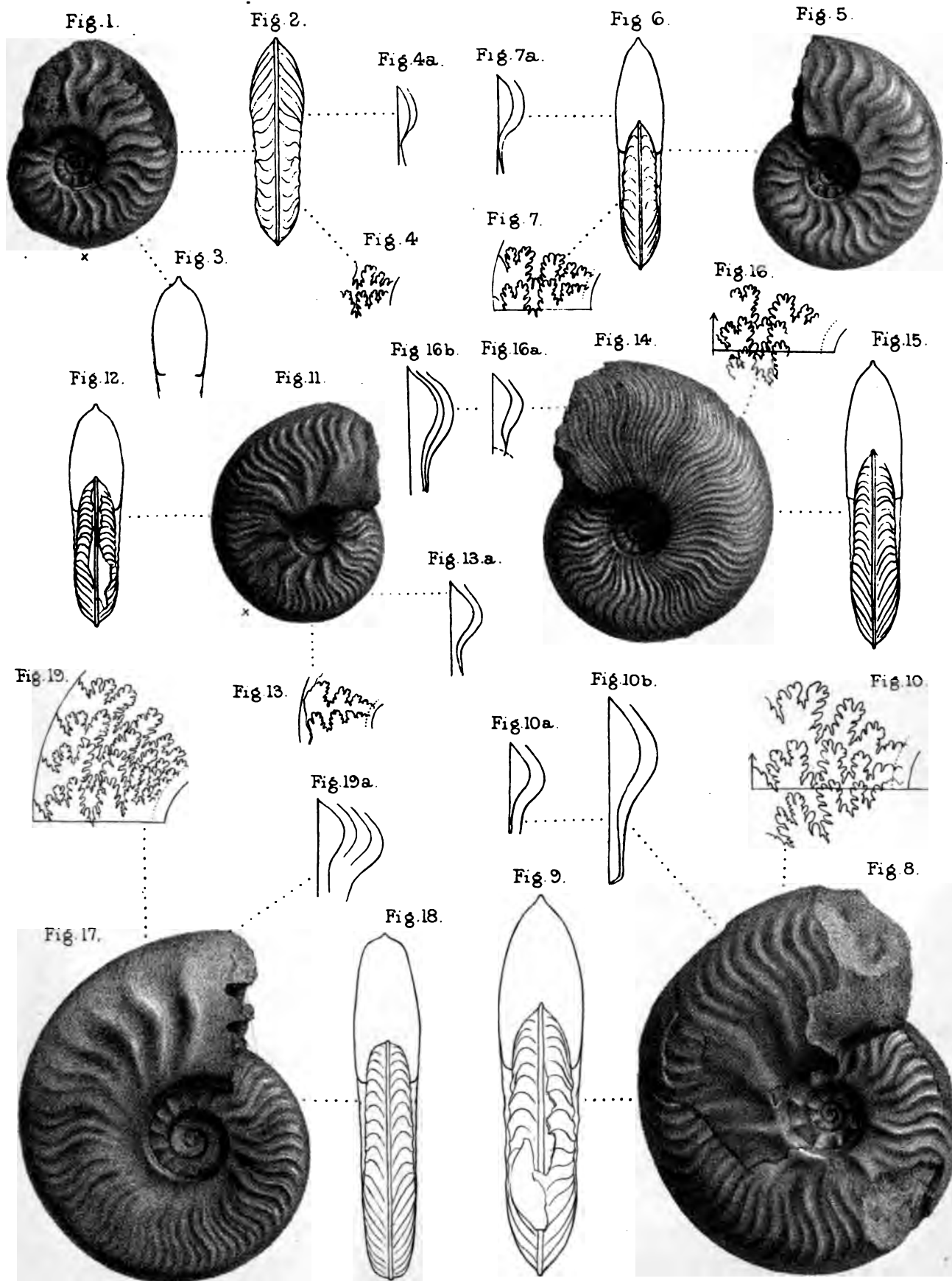
Scissi or *Murchisonæ hemera.*

Figs. 17—19.—*GEYERIA FASCIATA*, *S. Buckman*.

Fig. 17.—Side view of a wholly septate specimen without test. The specimen is labelled "Sherborne," Dorset, and its matrix shows that it is from not far above the Sands. My Collection. (Page l.)

Fig. 18.—Front view.

Fig. 19.—Suture-lines. 19 *a*.—Radial curves.



SUPPLEMENT, PLATE VII.

Scissi hemera.

Figs. 1—6.—*LIOCERAS BIFIDATUM*, *S. Buckman*.

Fig. 1.—Side view of a specimen with practically complete body-chamber. Burton Bradstock, Dorset. From the Collection of Mr. Darell Stephens, F.G.S. (Page xxxviii.)

Fig. 2.—Front view.

Fig. 3.—Radial curve.

Fig. 4.—Side view of a young example, showing costæ passing into striæ. Burton Bradstock. From the same Collection.

Fig. 5.—Front view.

Fig. 6.—Radial curve (costate stage). 6 *a*.—The same (striate stage).

Figs. 7—12.—*LIOCERAS COMPTUM* (*Reinecke*).

Fig. 7.—Side view of a young, wholly septate example with test. Burton Bradstock. From the same Collection. (Page xliii.)

Fig. 8.—Front view, in outline.

Fig. 9.—Suture-line. 9 *a*.—Radial curve.

Fig. 10.—Side view of a larger example. Beaminster, Dorset. From the same Collection.

Fig. 11.—Front view.

Fig. 12. Suture-lines. 12 *a*, 12 *b*.—Radial curves.

Figs. 13—16.—*LIOCERAS THOMPSONI*, *S. Buckman*.

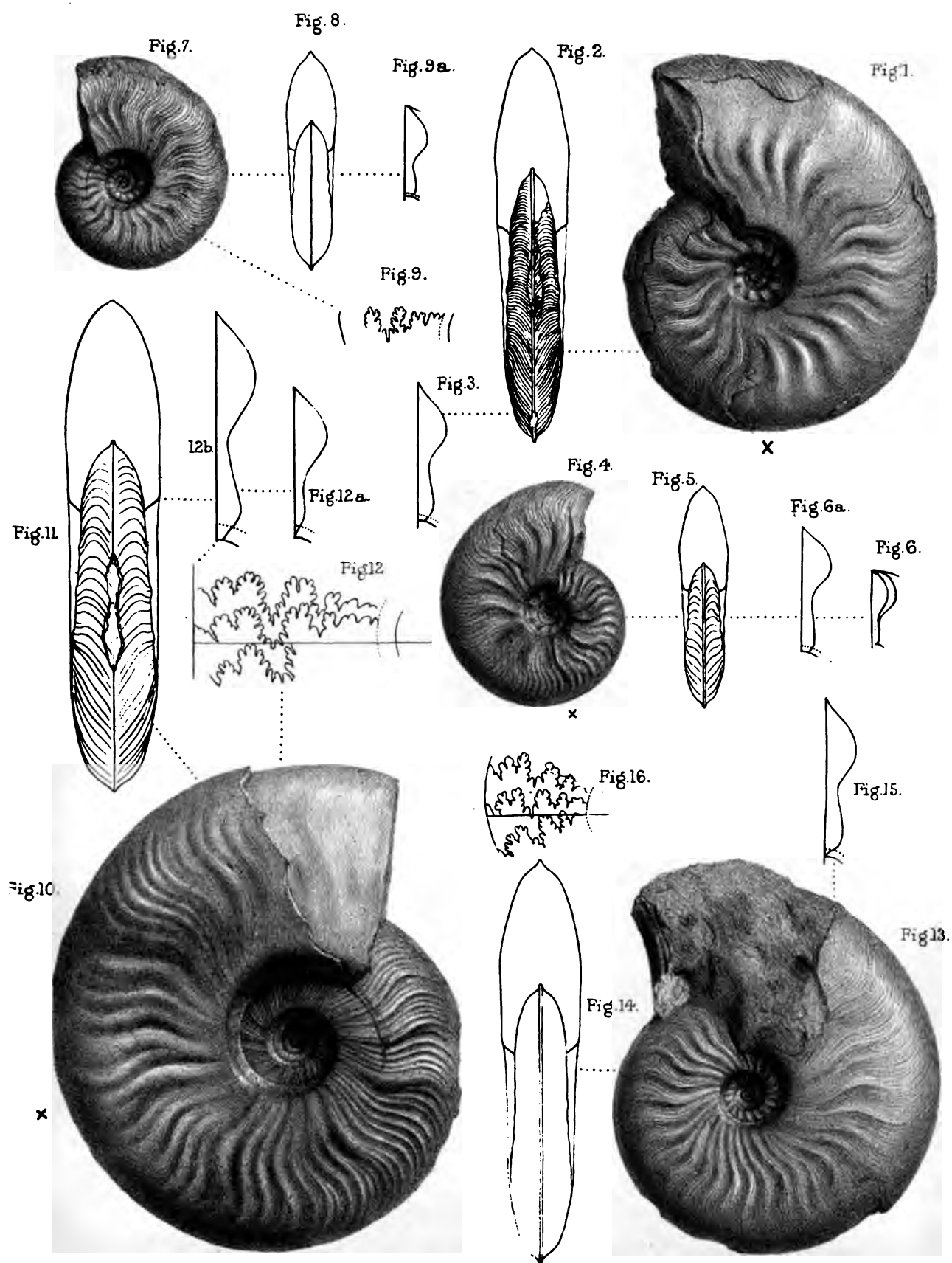
Fig. 13.—Side view of a wholly septate specimen with test. From the Northampton Sands, Duston, near Northampton. From the Collection of Mr. Beeby Thompson, F.G.S. (Page xl.)

Fig. 14.—Front view, in outline.

Fig. 15.—Radial curve.

Fig. 16.—Suture-lines from another specimen. Same locality and Collection.

All the specimens depicted in this Plate are now in my cabinet.





1

2

3

4

SUPPLEMENT, PLATE VIII.

Scissi hemera.

Figs. 1—3.—*LIOCERAS LINEATUM*, *S. Buckman.*

Fig. 1.—Side view of a wholly septate specimen. Burton Bradstock, Dorset.
From the Collection of Mr. Darell Stephens, F.G.S. (Page xl.)

Fig. 2.—Front view, in outline. 2 *a.*—Section of periphery with test.

Fig. 3.—Parts of two suture-lines. 3 *a.*—The same at a larger diameter.
3 *b.*—Radial curves.

Figs. 4—6.—*LIOCERAS GRAVE*, *S. Buckman.*

Fig. 4.—Portion of side view, to show concavumbilicus. Burton Bradstock.
From the same Collection. (Page xli.)

Fig. 5.—Front view, in outline.

Fig. 6.—Parts of suture-lines. 6 *a.*—Radial curve.

Opaliniformis hemera.

Figs. 7—9.—*CYPHOLIOCERAS PLICATUM*, *S. Buckman.*

Fig. 7.—Side view of a specimen with test. Haresfield Hill, Gloucestershire.
My Collection. (Page xlv.)

Fig. 8.—Front view in outline.

Fig. 9.—Radial curve.

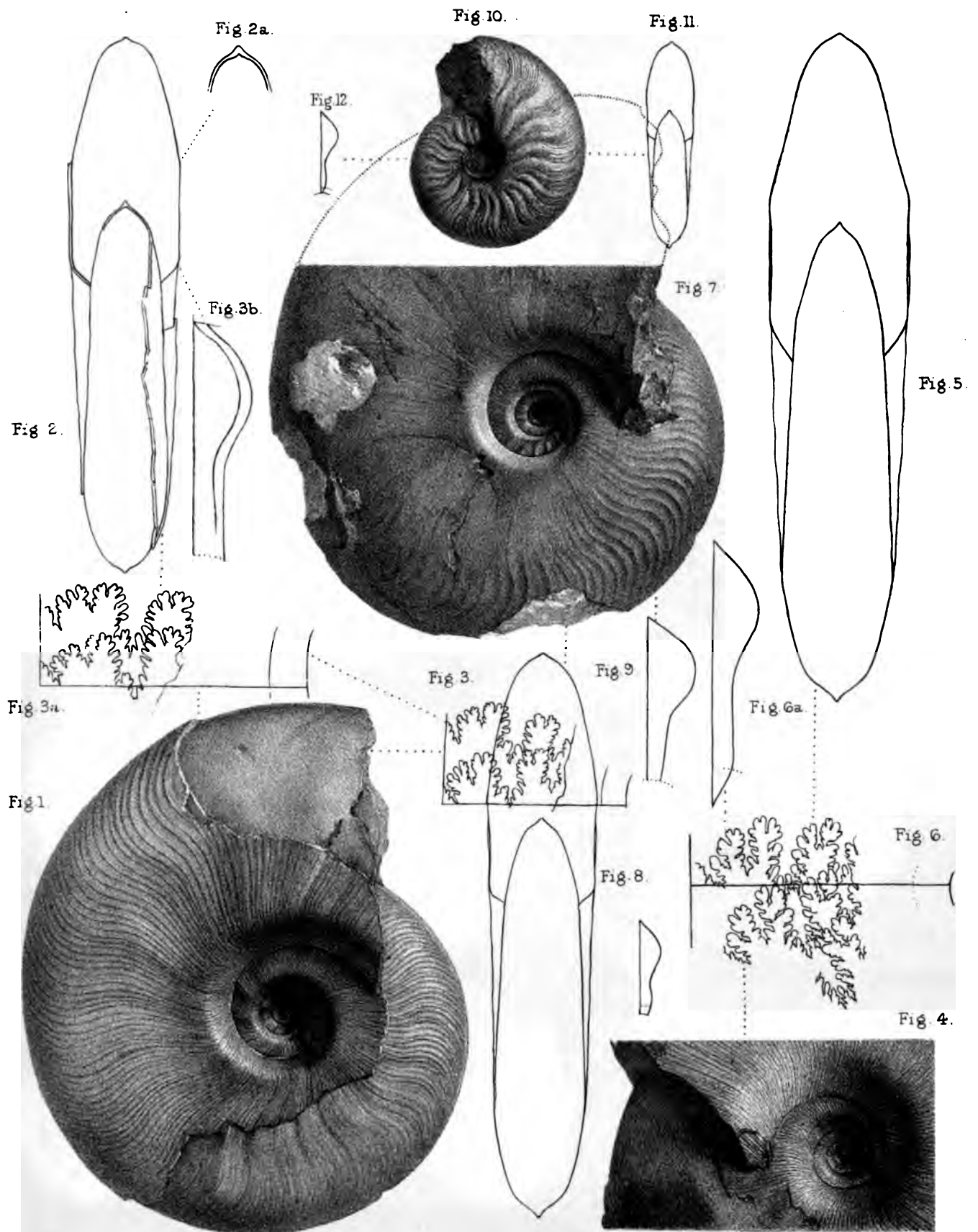
Scissi hemera.

Figs. 10—12.—*LIOCERAS PLICATELLUM*, *S. Buckman.*

Fig. 10.—Side view. Stinchcombe Hill, Gloucestershire. My Collection.
(Page xxxviii.)

Fig. 11.—Front view, in outline.

Fig. 12.—Radial curve, taken where costate stage is passing to striate.



SUPPLEMENT, PLATE IX.

Scissi hemera.

Figs. 1—3.—*LIOCERAS UNDULATUM*, *S. Buckman.*

Fig. 1.—Side view of a specimen almost without test. Burton Bradstock. (Page xxxix.)

Fig. 2.—Front view.

Fig. 3.—Radial curves.

Figs. 4—6.—*LIOCERAS PARTITUM*, *S. Buckman.*

Fig. 4.—Side view of a specimen with a portion of test preserved. Burton Bradstock. (Page xxxix.)

Fig. 5.—Whorl-section.

Fig. 6.—Suture-lines. 6 *a*, 6 *b*.—Radial curves.

(This is the type. For figures of other examples see Pl. XIII, fig. 11, Pl. XIV, figs. 3, 4, under the name *Lioceras opalinum*, var. *comptum*, which should now be altered.)

Figs. 7—9.—*LIOCERAS PLICATELLUM*, *S. Buckman.*

Fig. 7.—Side view, mostly without test. (Page xxxviii.)

Fig. 8.—Front view.

Fig. 9.—Suture-lines. 9 *a*.—Radial curves.

(This specimen is the type. For a young example see Supplement, Pl. VIII, figs. 10—12.)

Figs. 10—12.—*LIOCERAS PLECTILE*, *S. Buckman.*

Fig. 10.—Side view, with a considerable portion of test present. Burton Bradstock. (Page xxxix.)

Fig. 11.—Front view.

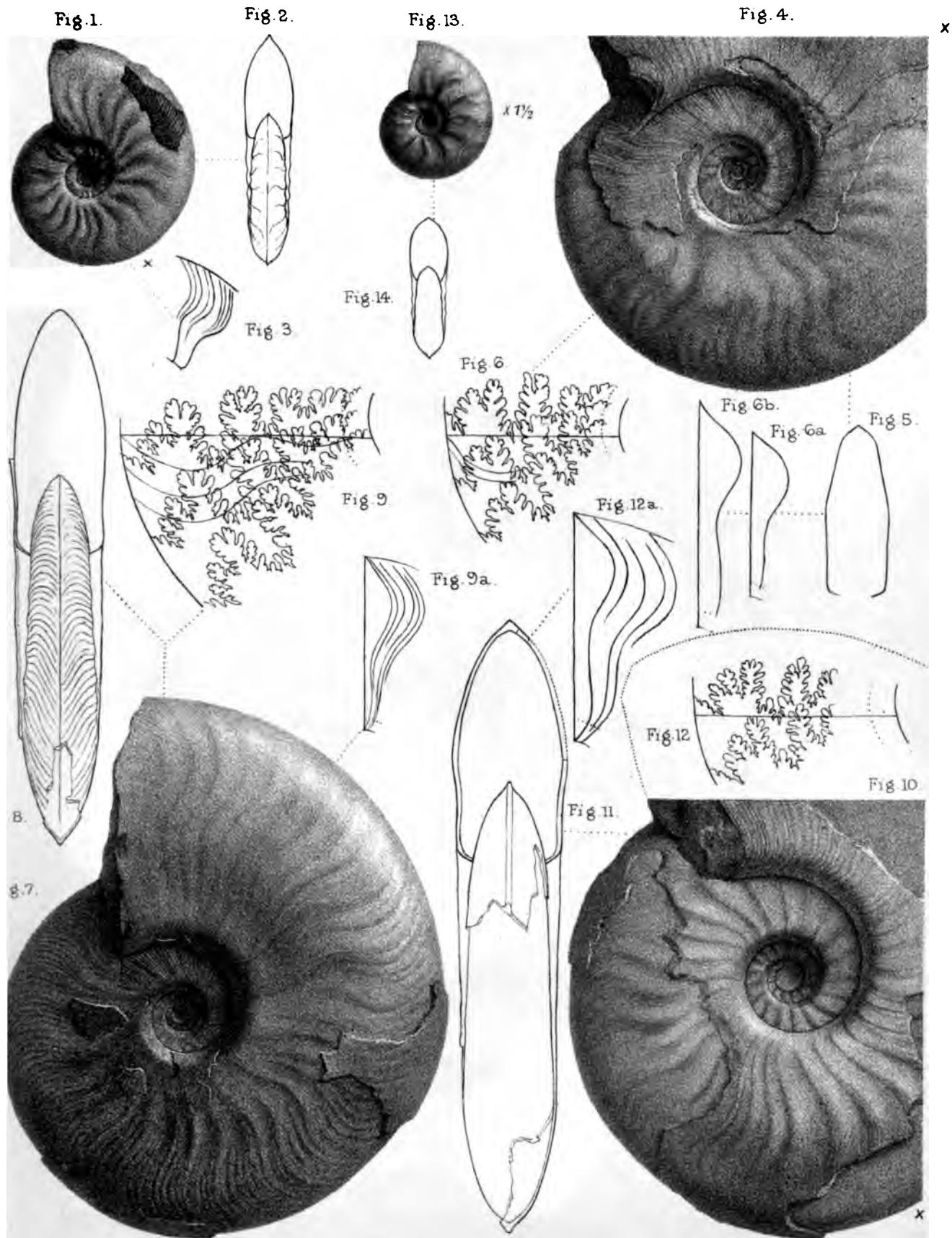
Fig. 12.—Parts of suture-lines. 12 *a*.—Radial curves.

Figs. 13, 14.—*LIOCERAS* sp., cf. *UNDULATUM*.

Fig. 13.—Side view of a small example with most of the test present. Enlarged $1\frac{1}{2}$. Burton Bradstock. (Page xxxix.)

Fig. 14.—Front view.

All the specimens depicted in this Plate were collected by Mr. Darell Stephens, F.G.S. They are now in my cabinet.



SUPPLEMENT, PLATE X.

Opaliniformis hemera.

Figs. 1—4.—*CYPHOLIOCERAS OPALINIFORME*, *S. Buckman*.

Fig. 1.—Side view of a young specimen. From the hard bed above the cephalopod bed, Haresfield Hill, Gloucestershire. (Page xlv.)

Fig. 2.—Whorl-section.

Fig. 3.—Radial line.

Fig. 4.—Radial line of the specimen depicted in Pl. XIII, figs. 1, 2.

Fig. 5.—*CYPHOLIOCERAS RENOVATUM*, *S. Buckman*.

Fig. 5.—Radial lines of the specimen depicted in Pl. XIV, figs. 7, 8. (Page xli.)

Sciuri hemera.

Figs. 6—8.—*LIOCERAS OPALINUM* (*Reinecke*).

Fig. 6.—Side view. Burton Bradstock. Collected by Mr. Darell Stephens, F.G.S. (Page xli.)

Fig. 7.—Whorl-section.

Fig. 8.—Suture-lines. 8 *a*, *b*.—Radial-lines.

Fig. 9.—*LIOCERAS* sp.

Fig. 9.—Radial line of the specimen depicted in Pl. XIV, fig. 1. (Page xlii.)

Fig. 10.—*LIOCERAS STRIATUM*, *S. Buckman*.

Fig. 10.—Radial-line of the specimen shown in Pl. XIII, fig. 6, as *Lioceras opalinum*, which should now be altered. (Page xlii.)

Aalensis hemera.

Figs. 11—13.—*PLEYDELLIA COMATA*, *S. Buckman*.

Fig. 11.—Side view. Burton Bradstock.

Fig. 12.—Whorl-section.

Fig. 13.—Suture-line. 13 *a*. Radial-line.

Murchisonæ hemera.

Figs. 14—16.—*MANSSELIA TRICHINIA*, *S. Buckman*.

Fig. 14.—Side view. Horn Park, near Beaminster. (Page lix.)

Fig. 15.—Whorl-section.

Fig. 16.—Suture-lines. 16 *a*, *b*. Radial-lines.

Figs. 17—19.—*VACEKIA STEPHENSI*, *S. Buckman*.

Fig. 17.—Side view. Bradford Abbas. Collected by Mr. Darell Stephens.

Fig. 18.—Front view.

Fig. 19.—Suture-lines. 19 *a*.—Radial-line.

Bradfordensis hemera.

Figs. 20—22.—*PAQUIERIA FLOCCOSA*, *S. Buckman*.

Fig. 20.—Side view. "Stoford, Somerset." (Page lxxviii.)

Fig. 21.—Whorl-section.

Fig. 22.—Suture-lines. 22 *a*.—Radial-line.

Figs. 23—28.—*COSMOGYRIA*? *MAGGSI*, *S. Buckman*.

Fig. 23.—Side view of a medium-sized specimen. Sherborne, Dorset. From the Collection of Mr. T. C. Maggs, F.G.S. (Page liv.) The ribs in the umbilicus have been rather exaggerated.

Fig. 24.—Whorl-section.

Fig. 25.—Suture-lines (part of). 25 *a*.—Radial-lines.

Fig. 26.—Side view of a young specimen. Probably from Sherborne. Collected by my father.

Fig. 27.—Front view.

Fig. 28.—Radial-line.

Figs. 29—31.—*BRASILINA CRINALIS*, *S. Buckman*.

Fig. 29.—Side view. Possibly from Halfway House, Dorset. From my father's Collection.

Fig. 30.—Whorl-section.

Fig. 31.—Radial-line.

Figs. 32—34.—*COSMOGYRIA*? *CIRRATA*, *S. Buckman*.

Fig. 32.—Side view. From Halfway House, Dorset. From the Collection of Mr. F. Ellis, who kindly added it to my cabinet. (Page liv.)

Fig. 33.—Whorl-section.

Fig. 34.—Suture-lines. 34 *a*.—Radial-line.

Figs. 35—37.—*Incertæ sedis*.

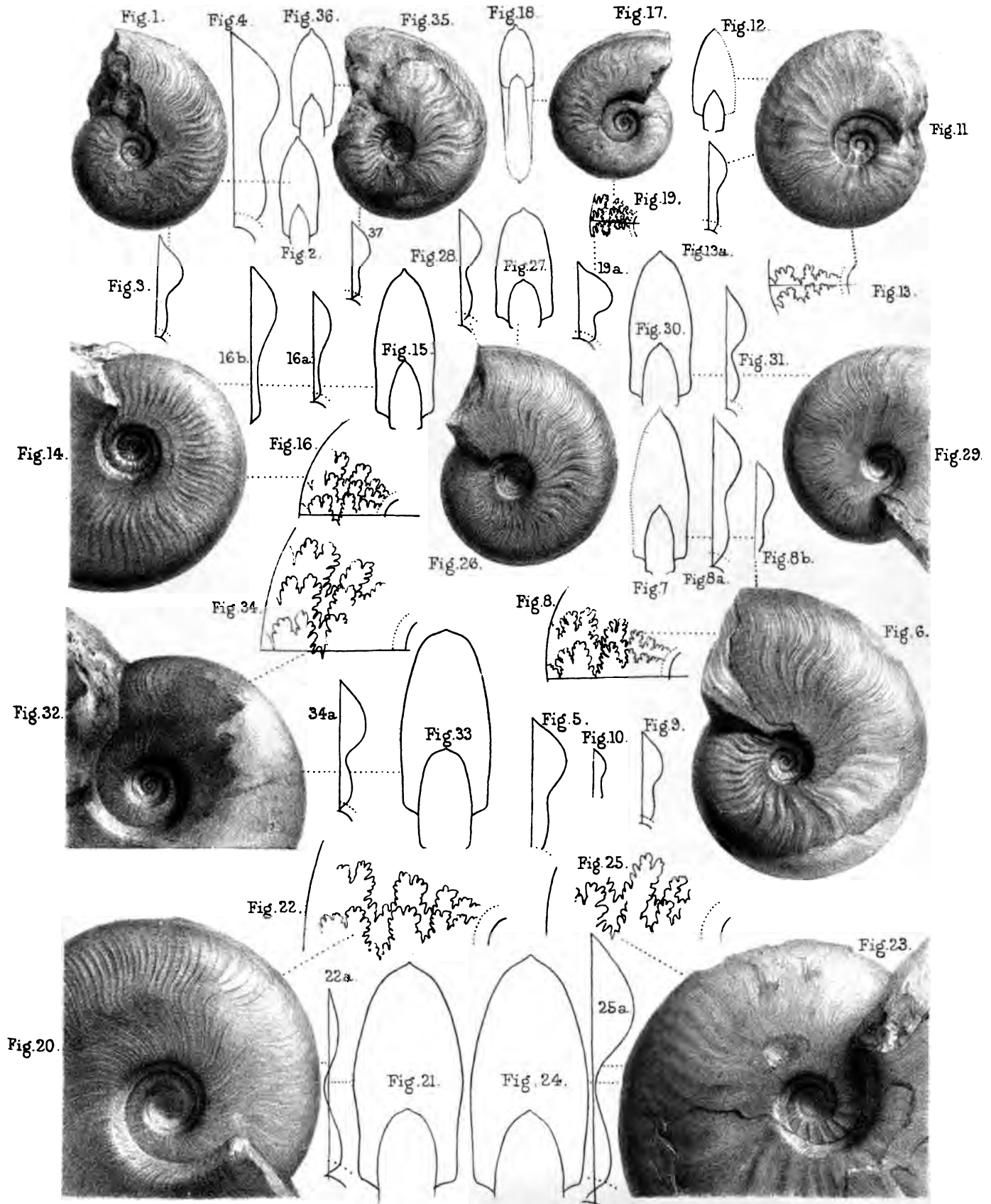
Fig. 35.—Side view. Paving Bed, Bradford Abbas. Collected by Mr. D. Stephens.

Fig. 36.—Whorl-section.

Fig. 37.—Radial-line.

All the specimens are in my Collection.

(NOTE.—This series of platyleptogyral, striate Ammonites, which may be called Opalinoids, has been purposely brought together on one plate to show the resemblance in superficial appearance and the difference in details. At least seven different types of radial curve are shown, the extremes being *Paquieria floccosa* and *Vacekia Stephensi*.)



1

1

SUPPLEMENT, PLATE XI.

Scissi hemera.

Figs. 1—3.—*RHÆBOCERAS TORTUM*, *S. Buckman*.

- Fig. 1.—Side view. Burton Bradstock. Collected by Mr. Darell Stephens, F.G.S. (Page lxxiii.)
 Fig. 2.—Whorl-section.
 Fig. 3.—Radial-lines.

Figs. 4—6.—*RHÆBOCERAS TOLUTARIUM* (*Dumortier*).

- Fig. 4.—Side view. Burton Bradstock. Collected by Mr. Darell Stephens, F.G.S. (Page lxxiii.)
 Fig. 5.—Whorl-section.
 Figs. 6, 6 *a*.—Radial-lines.

Murchisonæ hemera.

Figs. 7—9.—*ANCOLIOCERAS CABINIFERUM*, *S. Buckman*.

- Fig. 7.—Side view. Mapperton, near Beaminster. (Page xlvii.)
 Fig. 8.—Whorl-section.
 Fig. 9.—Radial-lines.

Figs. 10—12.—*GEYERIA* ? *EVERTENS*, *S. Buckman*.

- Fig. 10.—Side view. Mapperton, near Beaminster. (Page l.)
 Fig. 11.—Front view, outline.
 Fig. 12.—Suture-lines. 12 *a*, *b*.—Radial curves.

Figs. 13—15.—*LUDWIGIA LÆVIGATA*, *S. Buckman*.

- Fig. 13.—Side view (portion). "Bottom Bed," Stoke Knap, near Broad Windsor, Dorset. (Page lxxii.)
 Fig. 14.—Whorl-section.
 Fig. 15.—Suture-line. 15 *a*.—Radial curve.

Figs. 16—18.—*CRICKIA REFLUA*, *S. Buckman*.

- Fig. 16.—Side view. Broad Windsor, Dorset. Collected by Mr. Darell Stephens, F.G.S. (Page lxxiv.)
 Fig. 17.—Whorl-section.
 Fig. 18.—Suture-line. 18 *a*.—Radial curve.

Figs. 19—21.—*PSEUDOGRAPHOCERAS LITERATUM*, *S. Buckman*.

- Fig. 19.—Side view of a specimen with test. Paving Bed, Bradford Abbas, Dorset. Collected by Mr. D. Stephens, F.G.S.
 Fig. 20.—Whorl-section.
 Figs. 21, 21 *a*.—Radial curves.

Bradfordensis hemera.

Figs. 22—24.—*PSEUDOGRAPHOCERAS DELETUM*, *S. Buckman*.

- Fig. 22.—Side view of a specimen with test. Bradford Abbas, Dorset, probably from marly stone just above the Paving Bed.
 Fig. 23.—Whorl-section.
 Figs. 24, 24 *a*.—Radial curves.

Murchisonæ hemera.

Figs. 25—27.—*MANSELIA SUBFALCATA*, *S. Buckman*.

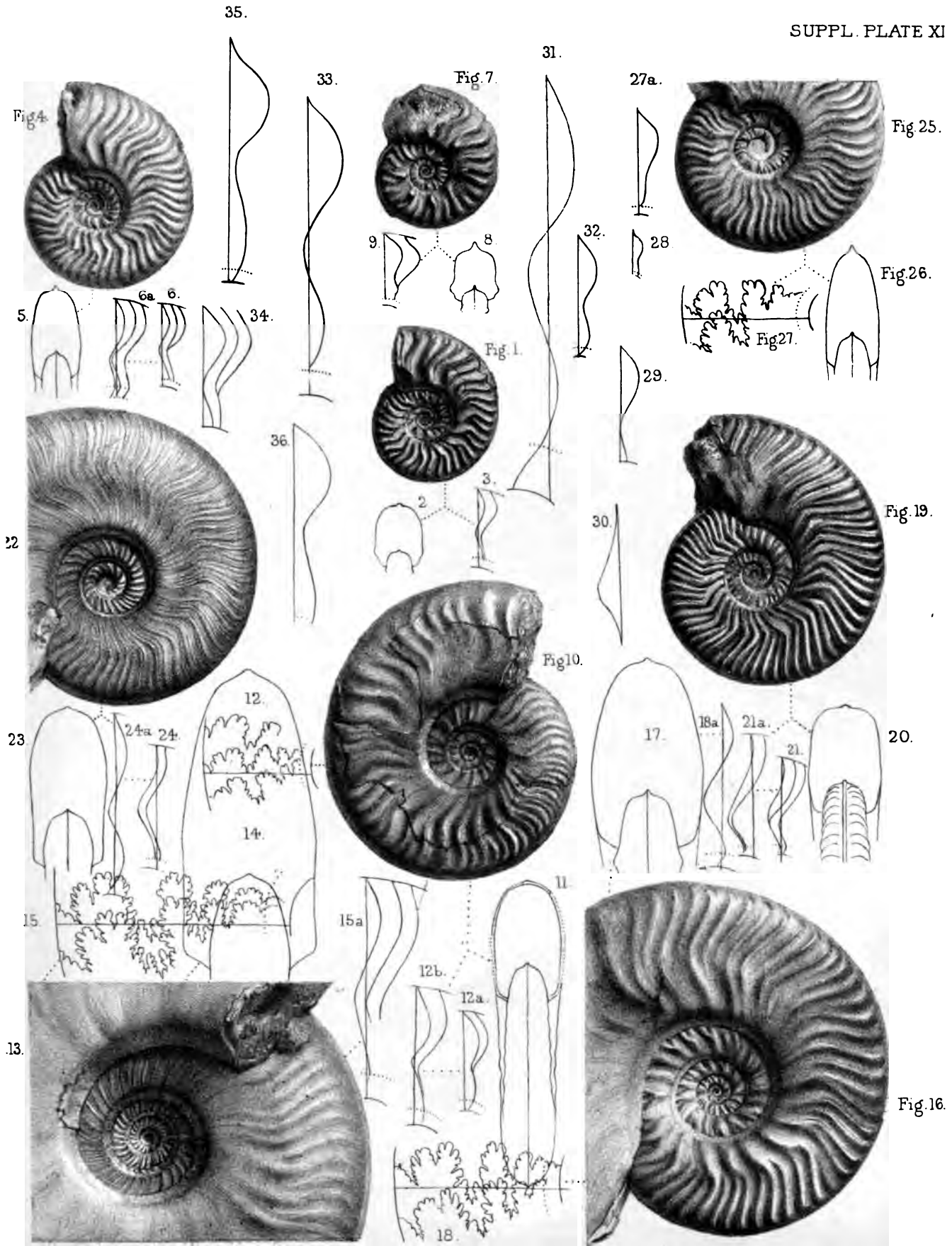
- Fig. 25.—Side view of a specimen without test. Halfway House, near Sherborne, Dorset. Collected by Mr. Darell Stephens. (Page lviii.)
 Fig. 26.—Whorl-section.
 Fig. 27.—Suture-lines. 27 *a*. Radial-line. (The middle portion should be nearer to the straight line.)

Figs. 28—36.—Radial lines.

- Fig. 28.—*Asthenoceras nannodes*, Pl. XXXIII, figs. 15, 16.
 Fig. 29.—*Ludwigina patula*, Pl. III, fig. 3.
 Fig. 30.—*Ludwigia tuberculata*, Pl. III, figs. 4, 5.
 Fig. 31.—*Witshireia gigantea*, Pl. XI, fig. 1.
 Fig. 32.—*Welschia pagana*, Pl. XII, figs. 5, 6, 7. (Page lii.)
 Fig. 33.—*Apedogyria platychora*, Pl. V.
 Fig. 34.—*Brasilina Baylii*, Pl. III, fig. 6.
 Fig. 35.—*Brasilina decipiens*, Pl. XII, figs. 8, 9.
 Fig. 36.—*Brasilina similis*, Pl. XV, figs. 1, 2.

The references denote the specimens from which the radial lines have been taken.

All the specimens are in my Collection.



SUPPLEMENT, PLATE XII.

Murchisonæ hemera.

Figs. 1—3.—*WELSCHIA OBTUSIFORMIS*, *S. Buckman.*

Fig. 1.—Side view of the type specimen with test. “Wild Bed,” Chideock Quarry Hill, Dorset. (Page li.)

Fig. 2.—Front view.

Fig. 3.—Suture-lines. 3 *a.* Radial-lines.

Figs. 4—9.—*HYATTIA WILSONI*, *S. Buckman.*

Fig. 4.—Side view of a specimen with test (the type). “Wild Bed,” Chideock Quarry Hill, Dorset. (Page lvi.)

Fig. 5.—Whorl-section.

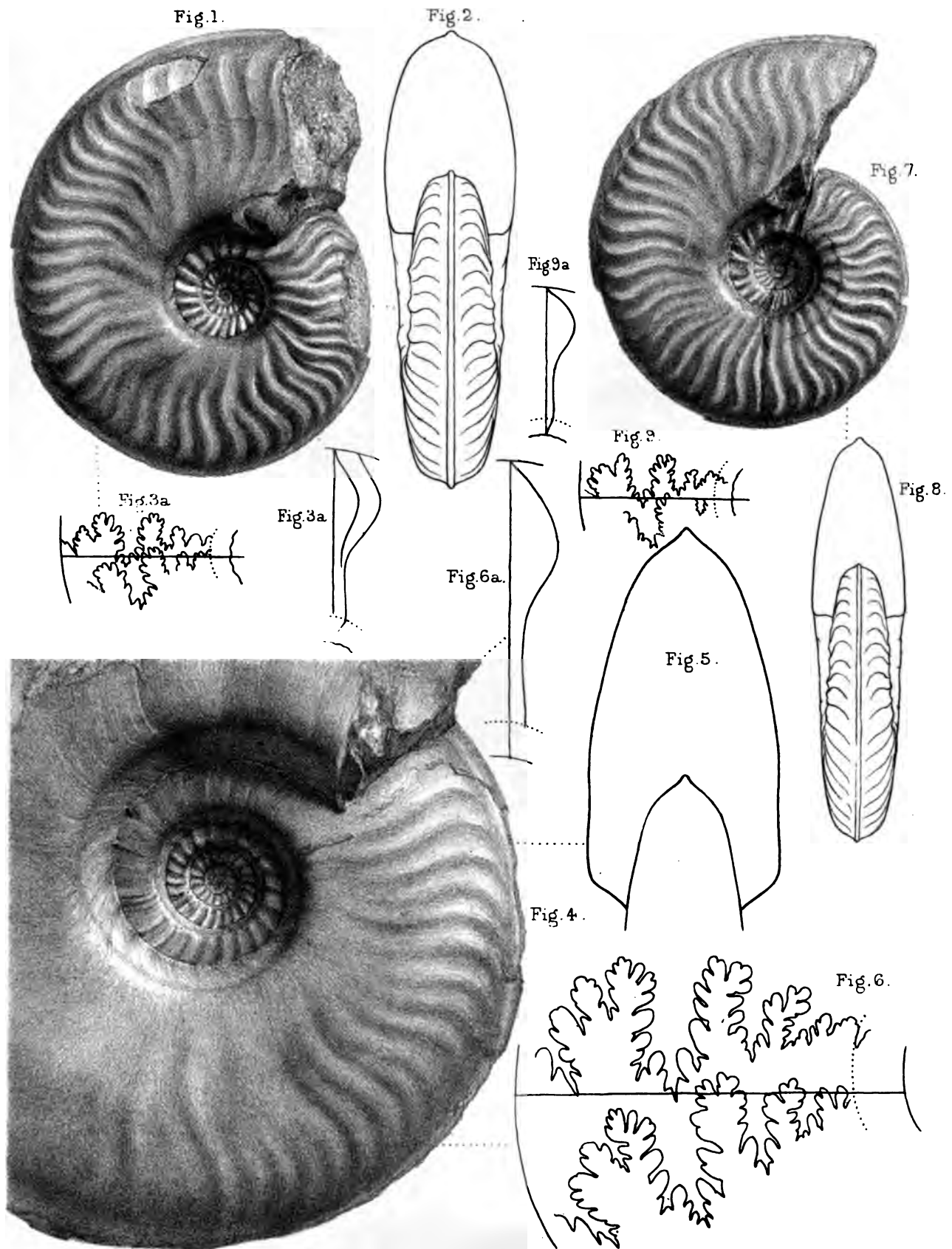
Fig. 6.—Suture-lines. 6 *a.* Radial-line.

Fig. 7.—Side view of a specimen without test. Dundry, Somerset. Collected by the late Mr. E. Wilson, F.G.S.

Fig. 8.—Front view.

Fig. 9.—Suture-lines. 9 *a.* Radial-lines.

All the specimens are in my Collection.



SUPPLEMENT, PLATE XIII.

Murchisonæ hemera.

Figs. 1—3.—*HYATTIA PUSTULIFERA*, *S. Buckman.*

Fig. 1.—Side view of a specimen with test well preserved. Chideock Quarry Hill, Dorset, from the "Wild Bed." (Page lv.)

Fig. 2.—Front view.

Fig. 3.—Suture-lines. 3 *a.*—Radial lines.

Figs. 4—6.—*MANSELIA SUBACUTA*, *S. Buckman.*

Fig. 4.—Side view of a specimen without test. Symonds bury, Dorset. (Page lviii.)

Fig. 5.—Whorl-section.

Fig. 6.—Suture-lines. 6 *a.*—Radial-line.

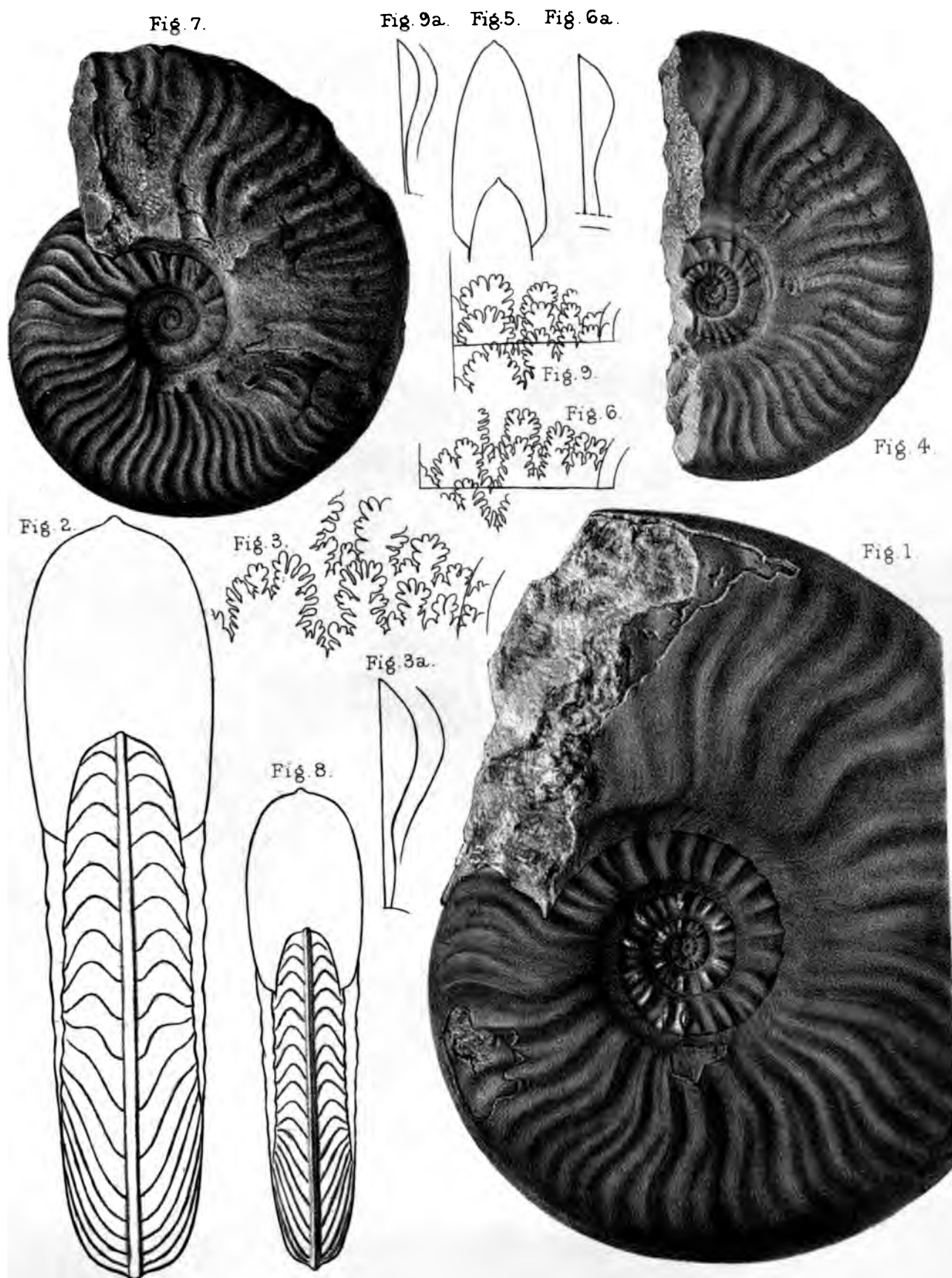
Figs. 7—9.—*HYATTINA BRASILI*, *S. Buckman.*

Fig. 7.—Side view of a specimen without test. Haselbury, Somerset. Collected by Mr. Darell Stephens. (Page lvii.)

Fig. 8.—Front view.

Fig. 9.—Suture-lines. 9 *a.*—Radial lines.

The specimens are in my Collection.



SUPPLEMENT, PLATE XIV.

Murchisonæ hemera.

Figs. 1, 2.—HYATTIA BULLIFERA, *S. Buckman*.

Fig. 1.—Side view. Pea Grit of the Cheltenham district, probably from Birdlip. Collected by my father. (Page lv.)

Fig. 2.—Whorl-section.

Figs. 3—5.—APEDOGYRIA PATELLARIA, *S. Buckman*.

Fig. 3.—Side view of a specimen with test. "Wild Bed," Chideock Quarry Hill, Dorset. (Page lix.)

Fig. 4.—Front view.

Fig. 5.—Suture-line. 5 *a*. Radial-line.

Figs. 6, 7.—LUDWIGIA PATULA, *S. Buckman*.

Fig. 6.—Side view. From Paving Bed, Bradford Abbas, Dorset, by matrix. Collected by my father. (Page lxi.)

Fig. 7.—Whorl-section.

For other figures of this species see Pl. III, fig. 3, under the name
Ludwigia Murchisonæ, which should now be altered.

Figs. 8—10.—LUDWIGIA HAUGI, *Douvillé*.

Fig. 8.—Side view. From Paving Bed, Bradford Abbas, by matrix. Collected by my father. (Page lxx.)

Fig. 9.—Peripheral view. 9 *a*.—Whorl-section.

Fig. 10.—Suture-lines. 10 *a*.—Radial-line.

Figs. 11, 12.—COSMOGYRIA sp.

Fig. 11.—Side view. From the "Wild Bed," Chideock Quarry Hill, Dorset. (Page liv.)

Fig. 12.—Peripheral view. 12 *a*.—Whorl-section. 12 *b*.—Radial-line.

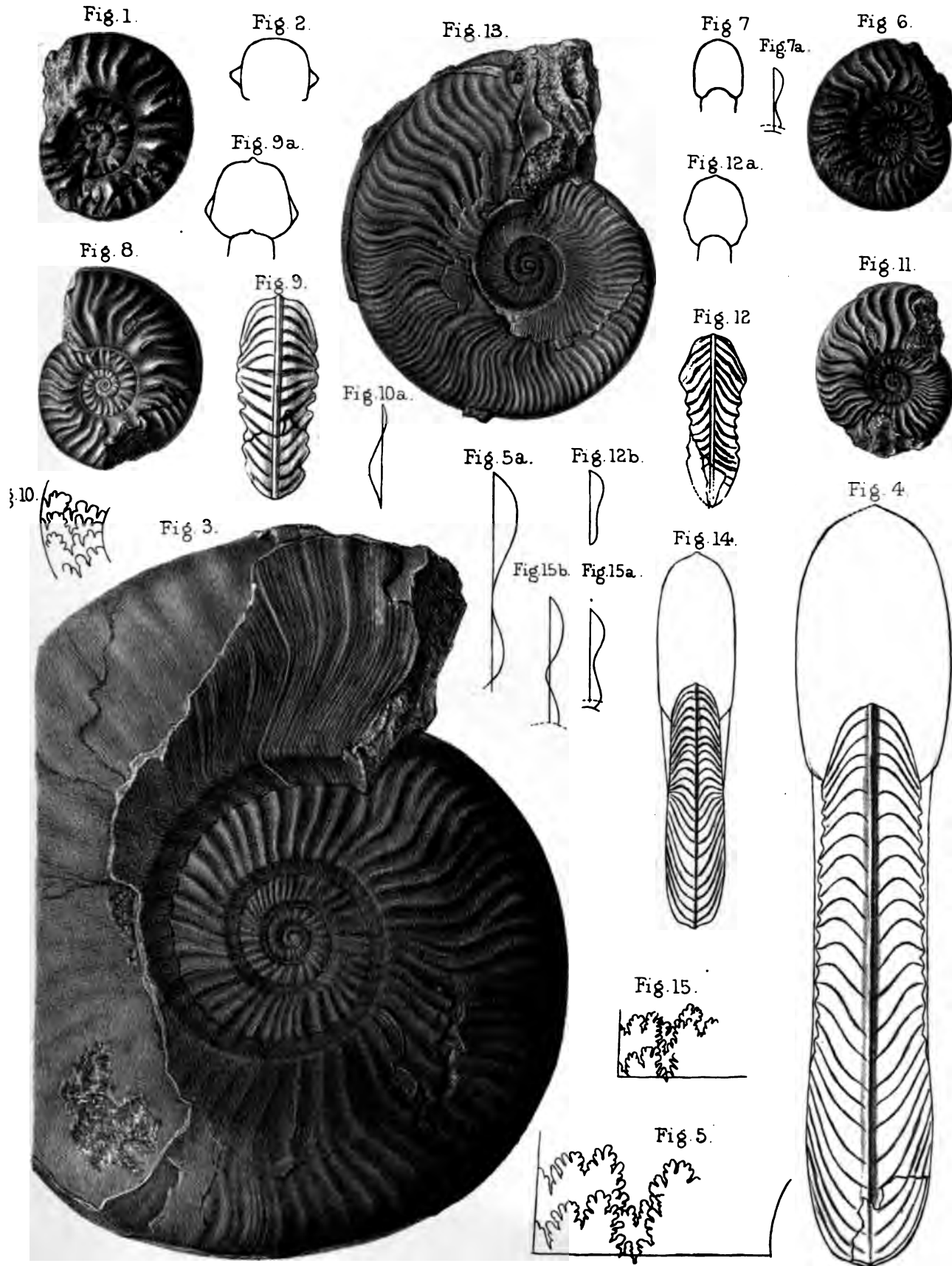
Figs. 13—15.—APEDOGYRIA? SUBCORNUTA, *S. Buckman*.

Fig. 13.—Side view, showing mouth-border with portion of lateral lappet. Horn Park, near Beaminster. (Page lx.)

Fig. 14.—Front view. The peripheral view is not sufficiently compressed.

Fig. 15.—Suture-lines. 15 *a*, *b*.—Radial-lines.

All the specimens are in my Collection.







London 1841

.



THE
PALÆONTOGRAPHICAL SOCIETY.

INSTITUTED MDCCCXLVII.

VOLUME FOR 1904.

LONDON:

MDCCCIV.

.

.

.

.

.

.

,



A MONOGRAPH

ON THE

INFERIOR OOLITE AMMONITES

OF

THE BRITISH ISLANDS.

BY

S. S. BUCKMAN, F.G.S.,

HONORARY MEMBER OF THE YORKSHIRE PHILOSOPHICAL SOCIETY.

PART XII.

SUPPLEMENT.

I.—REVISION OF, AND ADDITION TO, THE HILDOCERATIDÆ.

PAGES lxxv—clxviii; PLATES XV—XIX.

LONDON:

PRINTED FOR THE PALEONTOGRAPHICAL SOCIETY.

1904.

PRINTED BY ADLARD AND SON, LONDON AND DOCKING.

but there is less compression and a more tabulate periphery. The radial curve differs.

Geological Position.—The Pea-grit series of Gloucestershire, and lower part of the so-called Inferior Oolite Limestone of Dorset-Somerset.



FIG. 22 a.—Radial line of *Kiliania laciniosa*. Substitute for Fig. 22, which is radial line of *Ludwigia* inserted by mistake.

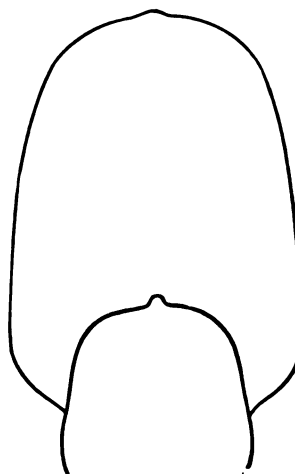
a. *Periphery tabulate.*

1. *KILIANIA ARMIPOTENS*, S. Buckman. Fig. 23 in text.

Description.—Platy-subpachygyral, subangustumbilicate, bullate changing to costate.



FIG. 23.—*Kiliania armipotens*. Chideock.



Note.—The tuberculate stage is very strongly developed ; some of the tubercles are almost spines.

Remarks.—This species, with its strongly tuberculate umbilicus, has the appearance of a *Sonninia*, or a *Hammatoceras* ; but the radial curve is a good distinction.

Localities and Strata.—Dorset: Chideock Quarry Hill, in the “Wild Bed ;” Gloucestershire: Birdlip, in the Pea-grit, two rather small, inferior specimens (one from Mr. J. F. Walker, F.G.S.).

Date of Existence.—*Murchisonæ* hemera.

2. *KILIANIA LACINIOSA*, S. Buckman. Suppl., Plate XV, figs. 4—6.

Description.—Platy-subpachygyral, gradumbilicate ; costate.

Note.—Instead of bullæ there are stout costæ on the inner whorls. The stout

costæ bifurcate, and there is also an occasional intermediate costa, obsolete on the inner area.

Distinction.—A rather smaller umbilicus and the difference of ornament are sufficient characters of distinction from *K. armipotens*.

Localities and Strata.—Dorset: Chideock Quarry Hill, in the "Wild Bed;" Somerset: Dundry (Castle Farm) brown limestone (Mr. L. Richardson); Gloucestershire: Leckhampton Hill, and Puckham Farm, Pea-grit; Whittington, Lower Freestone—these places all near Cheltenham.

Date of Existence.—*Murchisonæ hemera*.

β. *Periphery subtabulate*.

3. *KILIANIA*? *TUBERATA*, *S. Buckman*. Suppl., Plate XV, figs. 1—3.

Description. — Subplaty - subpachygyral, gradumbilicate; bullati - costate to costate.

Note.—There are generally two ribs springing from a bulla, and sometimes also an intermediate rib, which, however, is not developed just in the space between the bullæ.

Affinity.—A form presumably of this genus, and allied to the present species, is *Am. Murchisonæ obtusus*, Quenstedt, 'Amm. Schwäb. Jura,' pl. lix, fig. 2.

Locality and Stratum.—Gloucestershire: probably Brockhampton Quarry, near Andoversford, in the Pea-grit series.

Date of Existence.—*Murchisonæ hemera*.

History of the Figured Specimen —Seen on the window-sill of a cottage at Sevenhampton, the parish of which Brockhampton is a hamlet, and about half a mile from the quarry. The cottager was uncertain as to its origin; but Brockhampton Quarry, where there is a development of the Pea-grit series, from which the pisolite character is almost absent, is a likely place.

2. *Latilobate*.

XXII. *Genus* —*PAQUIERIA*,¹ *S. Buckman*.

(Type—*Paquieria angulata*, sp. n.)

1899. *PAQUIERIA*, This Monogr., Expl. of Suppl., Pl. x.

Definition. — Platy-subleptogyral, subangustumbilicate; densiseptate, subbrevilatilobate; laterally anguliradiate; peripherally obtusanguliradiate, fastigate, parvi-nonsepti-carinate.

¹ In honour of Mr. V. Paquier, Faculté des Sciences, Grenoble.

Distinction.—From *Kiliana*, greater compression, the brevi-latilobate character, the fastigate periphery.¹

1. PAQUIERIA ANGULATA, S. Buckman. Woodcut fig. 24 in text.

Description.—Platy-subleptogyral, costati-gradumbilicate; costate to striate.

Note.—The costate stage is well shown in the early whorls. The decline to striae is rather rapid.

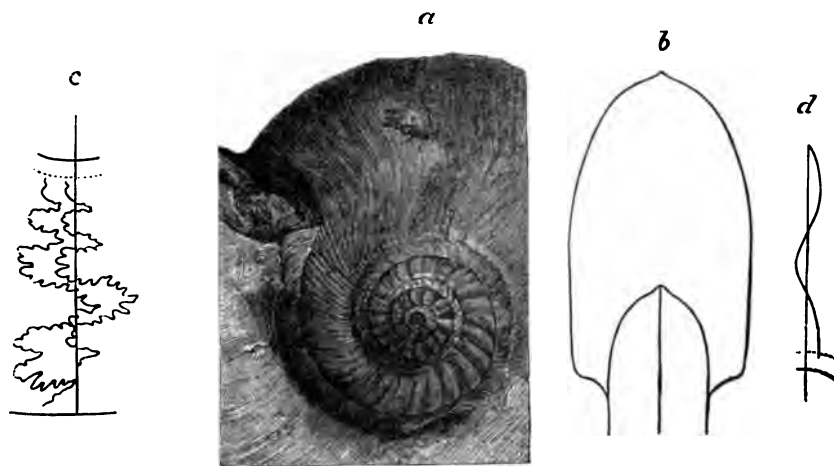


FIG. 24.—*Paquierea angulata*. a, side view; b, whorl section; c, suture lines; d, radial line. Haselbury.

Locality and Stratum.—Somerset: Haselbury, from the white limestone of the “lower beds.”

Date of Existence.—Murchisonæ hemera.

2. PAQUIERIA FLOCCOSA, S. Buckman. Suppl., Plate X, figs. 20—22.

Description.—Platy-subleptogyral, subconcavumbilicate; striate.

Note.—*P. floccosa* may be called an *Opalinoid* in point of shape and ornament, but the radial curve forms an easy means of discrimination from *Lioceras*.

Distinction.—From *P. angulata*, smaller umbilicus.

Locality and Stratum.—Somerset: Stoford, in a somewhat ironshot matrix.

Date of Existence.—Bradfordensis hemera, probably.

¹ Fastigation of the periphery is a feature varying with degree of development; but it seems doubtful if the fully costate species of this genus would have possessed such a tabulate periphery as that of *Kiliana laciniosa*.

B. Magnilobate.

XXIII. Genus—WILTSHIREIA,¹ S. Buckman.

(Type—*Wiltshireia gigantea*, S. Buckman.)

1888. LIOCERAS (pars), This Monogr., p. 21.

1899. WILTSHIREIA, This Monogr., Expl. of Suppl. Pl. XI (misprint).

Definition.—Platy-subpachygyral, angustumbilicate; paucisep-tate, longi-sublatilobate; laterally subanguliradiate; peripherally obtusanguliradiate, subfastigate, parvi-nonsepti-carinate.

Distinction.—This genus resembles *Kiliania* in general mode of growth and proportions; any difference in the definition is due to the generic types not being in the same stages of phyletic development. Even the radial curve is the same, but the suture-line is entirely distinct; it is of a bold type with a large superior lateral lobe. Comparing the homœomorphs of the two genera, namely *Wiltshireia gigantea* and *Kiliania? gallica*,² at almost the same diameter, the superior lateral lobe of the former is twice as long and broad as that of the latter, so that one loculus in the former occupies the space of two loculi in the latter.



FIG. 25.—Radial line of *Wiltshireia gigantea*.

1. WILTSHIREIA GIGANTEA (S. Buckman). Plate XI, fig. 1; Plate XII, fig. 4; Plate A, fig. 12; Suppl., Plate XI, fig. 31; Plate XV, figs. 7, 8.

1888. LIOCERAS BRADFORDENSE, var. GIGANTEUM, This Monogr., Pl. xi, fig. 1; Pl. xii, fig. 4; Pl. A, fig. 12.

Description.—Platy-subpachygyral, gradumbilicate; costate, declining to lævigatae.

Note.—The type specimen (Pl. XI, fig. 1) was, judging by the position of its last septum, as much as 330 mm. in diameter when alive.

Localities and Strata.—Dorset: Stoke Knap, near Broad Windsor, in the base

¹ In compliment to the Rev. Dr. T. Wiltshire, F.G.S.

² *Kiliania? gallica*, sp. n. I give this name to a remarkable homœomorph, a foreign specimen kindly presented to me by Mr. L. Brasil. Suppl., Pl. XV, figs. 7 and 8a, may represent it, but not fig. 8. It is parvilobate. The character of suture-line, shown in figs. 3 or 6, of Suppl., Pl. XV, must be added to figs. 7 and 8a to get a correct representation. "Bradfordensis beds, May-sur-Orne, Calvados."

of the Building Stone; Horn Park, near Beaminster, in an ironshot matrix, which is really the same bed.

Date of Existence.—*Bradfordensis* hemera.

XXIV. Genus—LUDWIGIA, Bayle.

(Type—*Ludwigia Murchisonæ*, Sow., sp.)

1887. LUDWIGIA, This Monogr., p. 16 (pars).

Definition.—Platy-subleptogyral, subangustumbilicate; subpauciseptate, longi-angustilobate; laterally anguliradiate; peripherally latanguliradiate, subtabulate, parvi-nonsepti-carinate.

Distinction.—From *Kiliana*, radial line, with more lateral bend; mode of growth, greater umbilication with greater compression; from *Paquieria* persistence of costæ, suture-line; from *Wiltshireia*, suture-line; from *Welschia* and *Cosmogoria*, radial line and mode of growth.

Remarks.—Bayle selected *Am. Murchisonæ* as the type of his genus *Ludwigia*, but what he figured by that name did not agree with Sowerby's type example. That was pointed out in the body of this work, though the matter did not seem of so much importance as at present. However, it was then decided to recognise Sowerby's and not Bayle's *Murchisonæ* as the type of the genus, and it is undesirable to alter that arrangement. Still it is doubtful whether any of Bayle's "*Murchisonæ*" belong to the genus *Ludwigia* as now defined: one has some similarity but differs in septation. (See *Ludwigia gradata*, p. lxxi.)

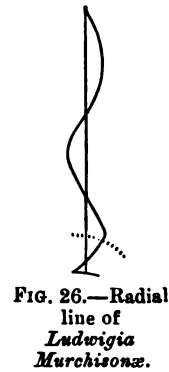


FIG. 26.—Radial line of *Ludwigia Murchisonæ*.

1. LUDWIGIA TUBERCULATA, S. Buckman. Plate III, figs. 4, 5; Plate A, fig. 2; Suppl., Plate XI, fig. 30.

1887. LUDWIGIA MURCHISONÆ, var. OBTUSA, This Monogr., Pl. iii, figs. 4, 5; Pl. A, fig. 2.

Description.—Subplaty-subpachygyral, sublatumbilicate; bullati-costate.

Note.—The bullæ are somewhat irregularly developed.

Distinction.—From *Hyattia bullifera*, a smaller umbilicus.

Localities and Strata.—Dorset: Beaminster, towards the base of the "Inferior Oolite" limestone. Another specimen unlocalised, probably from Haselbury, Somerset, and certainly from the horizon of *Zeilleria anglica*, for there is an example thereof in the matrix.

Date of Existence.—*Murchisonæ* hemera.

2. *LUDWIGIA HAUGI*, Douvillé. Suppl., Plate XIV, figs. 8—10.

1884. *LUDWIGIA HAUGI*, Douvillé, Zone *Am. Sowerbyi*; Bull. Soc. géol. France, 3e série, vol. xiii, p. 26.

1885. — — *Haug*, Beiträge Monogr. *Harpoceras*; Neues Jahrbuch für Mineral., &c., Beil.-Bd. iii, pl. xii, fig. 9 (type-figure).

Description.—Subplaty-subpachygyral, sublatumbilicate, subbullati-costate.

Remarks.—Douvillé proposed the name *Ludwigia Haugi* as a specific designation for *Ammonites Murchisonæ obtusus*; but, in the first place, in using the restricted genus *Ludwigia* instead of *Ammonites* there was no need to give a name other than *obtusus*. However, under the name *Am. Murchisonæ obtusus*, palæontologists had been accustomed to group several different forms; so that fixing Quenstedt's name *obtusus* on his original figure, it is possible to keep Douvillé's name *Haugi* for one of the others. As to which it shall be there need be no doubt, for in the following year (1885) Haug gave a figure under the name *Ludwigia Haugi*; and as this is the first figure given under this name, and as it is certainly one of the forms which would have been called "*Am. Murchisonæ obtusus*," and as Haug was well qualified to interpret Douvillé in this matter, it may be taken as the type-figure of the present species. The specimen now depicted agrees with Haug's figure in proportions; but it has not quite such a rursicostate character of the outer portion of the ribs. It almost seems as if this character had been somewhat exaggerated in his figure.

Distinction.—From *L. tuberculata*, less ornament.

Localities and Strata.—Bradford Abbas, in the Paving Bed. Foreign: Normandy (Calvados), "May-sur-Orne, *Murchisonæ* [beds]" (Dr. L. Brasil).

Date of Existence.—*Murchisonæ hemera*.

3. *LUDWIGIA MURCHISONÆ* (*J. de C. Sowerby*). Plate II, figs. 1, 2, 5; Plate III, figs. 1, 2; Plate A, fig. 8; Suppl., fig. 26.

1829. *AMMONITES MURCHISONÆ*, *J. de C. Sowerby*, Min. Conch., pl. dl.

1857. *LUDWIGIA MURCHISONÆ*, This Monogr., Pl. ii, figs. 1, 2, 5; Pl. iii, figs. 1, 2 Pl. A, fig. 8.

Description.—Platy-subleptogyral, gradumbilicate; costate declining to striate.

Distinction.—From *L. Haugi*, rather thinner; less strongly costate; and in the adult the regular costæ fail about half a whorl earlier.

Localities and Strata.—Isle of Skye: Holme, near Portree, in "Micaceous sandstone" (Sowerby's original).¹ Dorset: Bradford Abbas, in the Paving Bed.

Date of Existence.—*Murchisonæ hemera*.

¹ "Coast of Trotternish, near islet of Holm," J. W. Judd, Sec. Rocks; 'Quart. Journ. Geol. Soc., vol. xxxiv, p. 720.

4. *LUDWIGIA GRADATA*, *S. Buckman*. Fig. 27 in text.

? 1878. *LUDWIGIA MURCHISONÆ*, *Bayle* (non *Sowerby*), *Explic. carte géol. France*,
pl. lxxxv, fig. 1 only.

Description.—Platy-subleptogyral, gradumbilicate; parvicostate.

Distinction.—From *L. Murchisonæ*, less coarse ornament, and a smaller umbilicus.

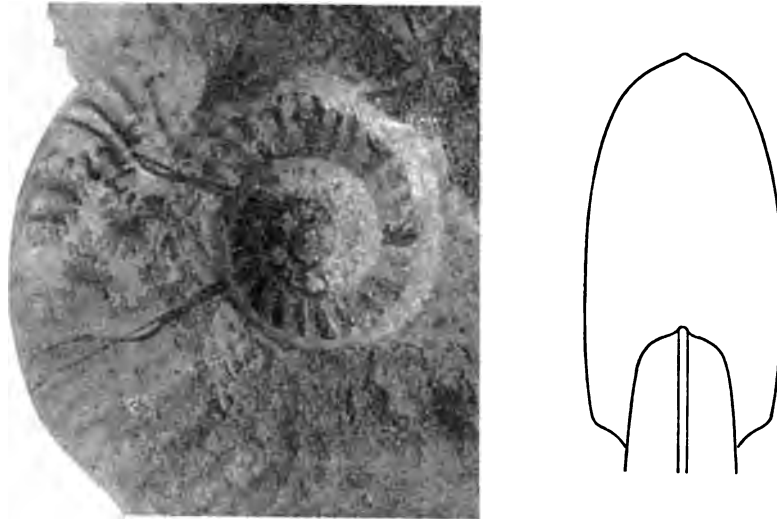


FIG. 27.—*Ludwigia gradata*. Near Sherborne.

Remarks.—The agreement with Bayle's figure seems to be close, yet our specimens are more densiseptate.

Localities and Strata.—Dorset: near Sherborne, from a bluish stone; Bradford Abbas [Paving Bed] (Monk Collection); Somerset: Haselbury, from the "lower beds." Foreign: Normandy, "May-sur-Orne, *Murchisonæ* [beds]" (Dr. L. Brasil).

5. *LUDWIGIA LEVIGATA*, *S. Buckman*. Suppl., Plate XI, figs. 13—15.

Description.—Platyleptogyral, subangusti-gradumbilicate, parvicostate declining to levigate.

Distinction.—From *L. gradata*, smaller umbilicus, less definite costæ.

Note.—The interest attaching to this species is its homœomorphy to *Wiltshireia gigantea*, to the specimen figured in Suppl., Pl. XV., figs. 7, 8. It differs, however, markedly in the size of its superior lateral lobe.

Locality and Stratum.—Dorset: Stoke Knap, in the bed below the Building Stone.

Date of Existence.—*Murchisonæ* hemera.

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

THE HISTORY OF THE

2. RHÆBOCERAS TOLUTARIUM (*Dumortier*). Suppl., Plate XI, figs. 4—6.

1874. AMMONITES MURCHISONÆ, *Dumortier*, Études pal. Bassin du Rhône, pt. 4,
pl. li. figs. 3, 4 (non 5, 6).

1874. — TOLUTARIUS, *Dumortier*, in Coll., p. 256.

Description.—Platysubleptogyral, subangustumbilicate, subparvicostate.

Distinction.—From *Rh. tortum*, greater compression and less coarse ornament.

^ *Remarks*.—*Dumortier* says,¹ “The compressed regular Ammonite of Verpillière which is abundant at Crussol, and of which I give a drawing in pl. li, figs. 3, 4, is remarkable for the shape of its ornament, and for its angular ribs. These ribs appear as if articulated in front at the places where they bifurcate, and they thus represent very fairly the arm and shank of a horse on the trot. Accordingly I placed this shell, in my collection, under the name of *A. tolutarius*, and though I only refer to it here as a variety of *A. Murchisonæ* I am not averse from believing that, later on, it will be convenient to separate this form as a distinct type; the fear of overmultiplying species alone prevents me from so doing at present.” He considered this and the preceding species to belong to *tolutarius*; but the one from la Verpillière (his figs. 5, 6) is certainly coarser ribbed and nearly twice as thick as that from Crussol (his figs. 3, 4). The latter, which he says is common, I have chosen as the type.

Locality and Stratum.—Burton Bradstock, in the *L. uncinatum* bed.

Date of Existence.—*Scissi hemera*.

XXVI. Genus—CRICKIA,² *S. Buckman*.

(Type—*Crickia reflua*, sp. n.)

1899. CRICKIA. This Monogr., Explan. of Suppl. Pl. xi.

Definition.—Subplatysubleptogyral, sublatumbilicate; subdensi-septate, longi-subangusti-lobate; laterally anguliradiate; peripherally latanguliradiate, subtabulate, parvi-nonsepti-carinate.

Distinction.—From *Rhæboceras*, the radial line has rather less peripheral projection, and the lateral bend falls further forward of the straight line. From *Ludwigia*, the mode of growth is different; there is a wider umbilicus and greater compression.



FIG. 29.—Radial line of *Crickia reflua*.

1. CRICKIA REFLUA, *S. Buckman*. Suppl., Plate XI, figs. 16—18.

Description.—Subplatysubleptogyral, sublatumbilicate, costate.

Remarks.—Two costæ are generally joined on the inner lateral area to form a

¹ Pp. 256, 257, pt. iv.

² In honour of Mr. G. C. Crick, F.G.S.

larger rib, and sometimes there is an intermediate costa which becomes obsolete on the inner part of the lateral area.

Localities and Strata.—Dorset: Broad Windsor, probably from the lower beds of the road-cutting at the entrance to the village; Chideock Quarry, "Wild Bed;" a remarkable specimen showing arrested development in youth, so that the umbilical stout ribs are absent. Somerset: Stoford is the likely locality of a small unlabelled specimen. Foreign: Normandy (Calvados), May-sur-Orne, "Concavum bed" (Dr. L. Brasil).

Date of Existence.—Murchisonæ hemera.

TORTIRADIATE.

In the species assigned to the following genera there is a peculiar form of radial line: it recalls with the guide-line the representations of the ivy-twined staff of Dionysus. Hence such radial line may for distinction be termed the caduceiform; and the genera bearing it may be grouped as tortiradiate. Among the species the caduceiform radial line changes sooner or later to a biarcuate style.

Generic distinction may depend on the time of this change. Thus:

1. Changes when lati-gradumbilicate and costate, *Depaoceras*.
2. Changes when gradumbilicate and subcostate, *Lucya*.
3. Changes when gradumbilicate and striate, *Paineia*.

Remarks.—The tortiradius is an earlier type than the anguliradius of the preceding genera. The evolution may be seen torti-, anguli-, and biarciradius in several species—for instance, *Paineia nitens*.

Of the present series *Lucya* retains the tortiradiate character longest, *Depaoceras* loses it earliest.

In the degree of the elaboration of costæ *Lucya* and *Depaoceras* are similar, while *Paineia* is quite distinct. In septation there are several differences.

XXVII. Genus—LUCYA,¹ S. Buckman.

(Type: *Lucya caduceifera*, sp. n.)

1887. LUDWIGIA, pars, This Monogr., p. 16.

1902. LUCYA, Emend. Amm. Nom., p. 4.

Definition.—Platy-subleptogyral, subangustumbilicate; subpauciseptate, sublongi-subangustilobate; laterally flexiradiate; peripherally latanguliradiate, subtabulate, parvi-nonsepti-carinate.

Distinction.—From *Wiltshireia*, by the radial and suture lines; from *Kiliania*, by the more flexed radial line and heavier style of costation.

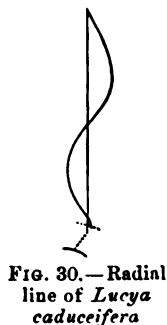


FIG. 30.—Radial line of *Lucya caduceifera*

¹ In memory of the late W. C. Lucy, F.G.S., ex-President of the Cotteswold Naturalists' Field Club.

1. *LUCYA CADUCEIFERA*, *S. Buckman*. Plate XXI, figs. 10, 11, Plate A, fig. 5; Suppl., Fig. 30 in text.

1889. *LUDWIGIA LUCYI*, var. This Monogr., Pl. xxi, figs. 10, 11; Pl. A, fig. 5.

1902. *LUCYA CADUCIFERA*, Emend. Ann. Nom., p. 4.

Description.—Platysubleptogyral, costati-gradumbilicate, subcrassicostate, subobsoleticarinate.

Remarks.—The very inconspicuous carina on a somewhat flattened periphery is a noticeable feature.

Locality and Stratum.—Presumably from the neighbourhood of Halfway House, Dorset, and from the *Rh. ringens*-bed (Collection, W. C. Lucy).

Date of Existence.—*Bradfordensis* hemera, presumably.

2. *LUCYA MARGINATA*, *S. Buckman*. Fig. 31 in text.

Description.—Platyleptogyral, gradumbilicate, subcrassicostate to striate.

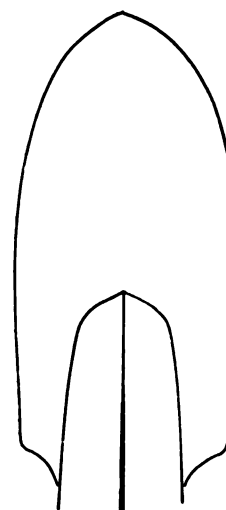
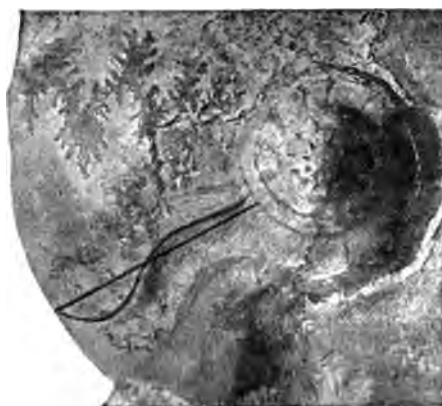


FIG. 31.—*Lucya marginata*. Bradford Abbas.

Remarks.—The radial line changes to biarcuate in the striate stage.

Distinction.—From *Lucya caduceifera*, smaller umbilicus, more acute periphery, greater compression.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, presumably lower part; Stoke Knap, Building Stone.

Date of Existence.—*Concavi* hemera, presumably.

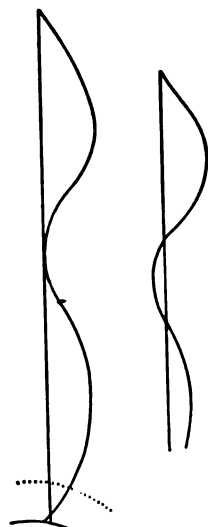


FIG. 32.—Radial lines of *Lucya magna*.

3. *LUCYA MAGNA*, S. Buckman. Plate VI; Suppl., Fig. 32 in text.

1887. *LIOCERAS CONCAVUM*, var. A, This Monogr., Pl. vi.

1902. *LUCYA MAGNA*, Emend. Amm. Nom., p. 4.

Description.—Platyleptogyral, concavumbilicate, subobscuro-crassicosate to striate.

Distinction.—From *Luc. marginata*, the concavumbilicus.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably lower part.

Date of Existence.—*Concavi* hemera, presumably.

4. *LUCYA* ? *CAVATA*, S. Buckman. Plate IX, figs. 1—4; Suppl., Plate XV, fig. 20.

1888. *LIOCERAS CONCAVUM*, var. V-SCRIPTUM, This Monogr., Pl. ix, figs. 1—4 only.

1902. *LUCYA CAVATA*, Emend. Amm. Nom., p. 4.

Description.—Platyleptogyral, concavumbilicate, striicostate to striate.

Distinction.—From *Luc. magna*, the concavumbilicus is larger, exposing more of the inner whorls; the character of the costation is less coarse.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part, judging by matrix.

Date of Existence.—*Discitæ* hemera, presumably.

XXVIII. Genus—*PAINEIA*,¹ S. Buckman.

(Type: *Paineia nitens*, sp. n.)

Definition.—Platyleptogyral, subangustumbilicate; subdensiseptate, subbrevisubangustilobate; laterally flexiradiate; peripherally latanguliradiate, subfastigate, parvi-nonsepti-carinate.

Distinction.—From *Lucya*, the characters of the suture-line and the proportions of the costæ.

Notes.—The suture-lines are closer together, there being about three in *Paineia* where there are two in *Lucya*; and the lobes of *Paineia* are distinctly shorter. With the same sized umbilicus the costæ are developed on a much less liberal plan in *Paineia* than in *Lucya*.

¹ In honour of the late Dr. T. Paine, for many years Hon. Secretary of the Cotteswold Field Club.

1. PAINEIA NITENS, *S. Buckman*. Fig. 33 in text.

Description.—Platyleptogyral, subangustumbilicate, subcostate to striate.



FIG. 33.—*Paineia nitens*. Sherborne. The carina is rather too prominent in the outline view.

Remarks.—From the costate to the striate stage the radial line changes.

Two or three costæ are connate to form single costæ in the inner area. The costæ of the outer lateral area decline as soon as those of the inner.

Localities and Strata.—Dorset: presumably Sherborne, Ambers Hill, *Rh. ringens*-bed (my father's collection). Somerset: Stoford, in a yellow matrix.

Date of Existence.—*Bradfordensis* hemera, presumably.

XXIX. Genus—DEPAOCERAS,¹ *S. Buckman*.

(Type, *Depaoceras fallax*, *S. Buckman*.)

1902. DEPAOCERAS, Emend. *Amm. Nom.*, p. 3.

Definition.—Platysubleptogyral, subangustumbilicate; subdensi-septate, sublongi-subangustilobate; laterally subanguliradiate; peripherally anguliradiate, subacutifastigate, subparvi-nonsepti-carinate.

Distinction.—From *Lucya*, earlier time of changing radial line, more acute periphery. From *Lioceras*, stouter mode of growth, smaller umbilicus, more distinct carination at one stage.

Note.—This genus is in many respects comparable with *Lioceras*. *L. uncinatum* shows a kind of anguliradius, indicative perhaps of a tortiradiate ancestor common to *Lioceras* and the present series.

¹ Δέπας, a bowl.

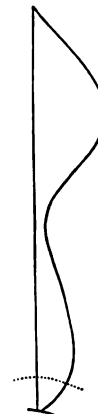


FIG. 34.—Radial line of *Depaoceras fallax*.

1. *DEPAOCERAS FALLAX* (*S. Buckman*). Plate XIV, figs. 10, 11 (Type); Plate XXI, figs. 7—9; Suppl., Plate XVI, figs. 1—3; figs. 34—36 in text.

1888. *LIOCERAS FALLAX*, *This Monogr.*, Pl. xiv, figs. 10, 11.

1889. *LUDWIGIA LUCYI*, *ibid.*, Pl. xxi, figs. 7—9.

1902. *DEPAOCERAS FALLAX*, *Emend. Amm. Nom.*, p. 3.

FIG. 35.

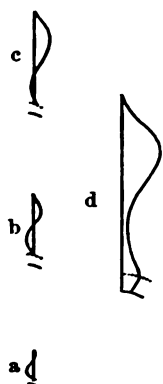


FIG. 36.

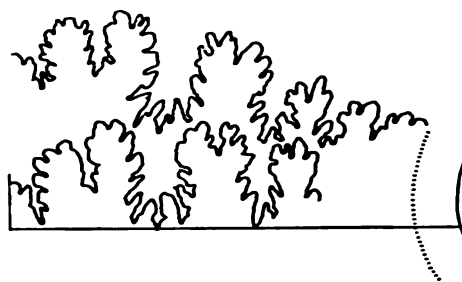


FIG. 35.—Radial lines of *Dep. fallax*, showing development: *a*, from specimen in Pl. xxi, figs. 8, 9; *b*, *c*, from Pl. xxi, fig. 7; *d*, from Suppl., Pl. xvi, fig. 1.

FIG. 36.—Suture-lines of *Dep. fallax*, from the adult, Pl. xiv, figs. 10, 11.

Description.—Platysubleptogyral, excentrigradumbilicate, subcrassicostate.

Remarks.—The costæ are rather coarse, somewhat distant, but not very distinct. Pl. XIV, fig. 10, shows them rather too plainly. If the series of specimens be rightly identified as the examples of the different stages of growth, then it may be remarked that the radial line becomes with age more and more biarcuate by the increasing length of the peripheral projection. On the other hand, the carina decreases in relative importance, being most pronounced in the middle-aged form, Suppl., Pl. XVI, figs. 1—3.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, from the upper part; Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera.

2. *DEPAOCERAS HAMATUM*, *S. Buckman*. Fig. 37 in text.

Description.—Platyleptogyral, subgradumbilicate, subparvicostate.

Distinction.—From *D. fallax*, smaller umbilicus, less coarse costation.



FIG. 37.—*Depaoceras hamatum*. Bradford Abbas.

Localities and Strata.—Dorset: Bradford Abbas (E. Wilson), Fossil Bed, presumably upper part; Halfway House (Mr. D. Stephens), from the “Blue beds.”

Date of Existence.—*Discitæ* hemera, presumably.

3. DEPAOCERAS FORMOSUM (*S. Buckman*). Plate X, figs. 1, 2; Suppl., Fig. 38 in text.

1888. LIOCERAS CONCAVUM, *var. FORMOSUM*, This Monogr.,
Pl. x, figs. 1, 2.

1902. DEPAOCERAS FORMOSUM, Emend. Amm. Nom., p. 3.

Description.—Platyleptogyral, subgradumbilicate, subobsoleticostate.

Note.—The costæ are broad and rather distant, but they are not prominent; the figure shows them rather too pronounced.

Distinction.—From *Dep. hamatum*, smaller umbilicus, which is not costate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera, presumably.

SUBFALCI- AND BIARCIRADIATE.¹

The radial line has a subfalcate form, passing to more or less of a double bow; in some cases it is distinctly so. Antecedent stages, of torti- or anguliradius, are presumable; but as yet there is no evidence as to the time of such changes of radial line in these genera.

¹ This term denotes a radial line with a form like a Greek bow. There are really three curves, one forward in the middle of the lateral area, and two backward on outer and inner thirds.



FIG. 38.—Radial line of *Depaoceras formosum*.

XXX. Genus—BRASILIA, *S. Buckman*.

(Type, *Brasilia bradfordensis*, *S. Buckman*.)

1887. LIOCERAS, *pars*, This Monogr., p. 21.

1899. BRASILIA, 'Jurass. Time;' Quart. Journ. Geol. Soc.,
vol. liv, p. 458.



FIG. 39.—Radial
line of *Brasilia*
bradfordensis.

Description.—Platysubleptogyral, subangustumbilicate; [subdensiseptate, brevilatilobate?]; laterally subanguliradiate; peripherally acutanguliradiate, subparvi-nonsepti-carinate.

Distinction.—From *Welschia*, more flexed radial line, ornament of smaller character, relatively narrower whorls.

a. Convexifastigate.

1. BRASILIA BRADFORDENSIS (*S. Buckman*). Plate IV, figs. 5, 6; Suppl., Plate XVII, fig. 28; Fig. 39 in text.

1887. LIOCERAS BRADFORDENSE, This Monogr., Pl. iv, figs. 5, 6.

Description.—Platysubleptogyral, gradumbilicate, parvicostate.

Locality and Stratum.—Dorset: Bradford Abbas, in the marl overlying the Paving Bed.

Date of Existence.—*Bradfordensis* hemera.

2. BRASILIA SUBLINEATA, *S. Buckman*. Plate VIII, figs. 5, 6; Suppl., Fig. 40 in text.

1888. LIOCERAS CONCAVUM, This Monogr., Pl. viii, figs. 5, 6.

1902. BRASILIA SUBLINEATA, Emend. Amm. Nom., p. 3.

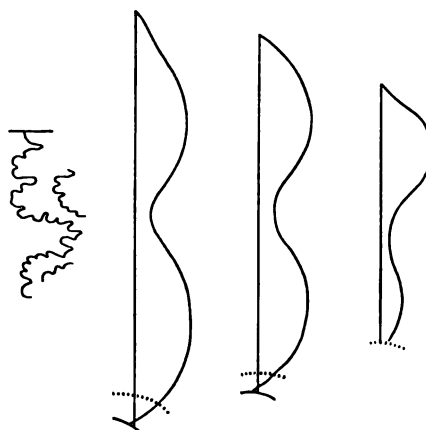


FIG. 40.—Suture-line and radial lines of *Brasilia sublineata*. The radial lines are from different parts of the same specimen, and show progressive decline of rostration.

Description.—Platyleptogyral, concavumbilicate; brevilatilobate; parvicostate to striate.

Distinction.—From *B. bradfordensis*, the concavumbilicus.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, lower part presumably.

Date of Existence.—*Concavi* hemera, presumably.

3. BRASILIA ? PULCHRA, *S. Buckman*. Plate X, figs. 3, 4; Suppl., Fig. 41 in text.

1888. LIOCERAS CONCAVUM, This Monogr., Pl. X, figs. 3, 4.

1902. BRASILIA PULCHRA, Emend. Amm. Nom., p. 3.

Description.—Platyleptogyral, concavumbilicate, parvicostate.

Distinction.—From *B. sublineata*, the subcostation more closely set.

Date of Existence.—*Discitæ* hemera, presumably.

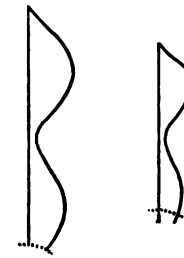


FIG. 41.—Radial lines of *Brasilia? pulchra*.

4. BRASILIA ? PINGUIS (*S. Buckman*). Plate XII, figs. 1—3; Suppl., Fig. 42 in text.

1888. LIOCERAS CONCAVUM, var. PINGUIS, This Monogr., Pl. xii, figs. 1—3.

1902. BRASILIA PINGUIS, Emend. Amm. Nom., p. 3.

Description.—Platysubleptogyral, concavumbilicate, parvicostate.

Remarks.—The generic position of this species is quite unsatisfactory. It is probably the representative of a series of comparatively stout-whorled forms which have yet to be discovered.

Locality and Stratum.—Dorset: Halfway House, near Sherborne, presumably from the *Rhynchonella ringens* bed.

Date of Existence.—*Bradfordensis* hemera, presumably.

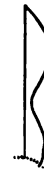


FIG. 42.—Radial line of *Brasilia? pinguis*.

β. Planifastigate.

I put some of the following species to *Brasilia* in the explanation of Suppl., Pl. XI, and therefore it is not advisable to make any change now. But they will have to be separated. They are planifastigate, there being a more or less distinctly defined, sloping, planate surface each side of the carina; while true *Brasilia* is convexifastigate without any defined area bordering the carina. Further, these species are distinguished by the very early date at which the smooth character appears, whereas *Brasilia* maintains small costæ.

Quite possibly the series is akin to *Lucya*, and the costate species, which have

yet to be discovered, would show the tortiradiate character, but less costation than *Lucya* and more carina. Radial line and periphery separate them from *Paquieria*.

5. *BRASILIA SIMILIS* (*S. Buckman*). Plate XV, figs. 1, 2; Plate A, fig. 13; Suppl., Plate XI, fig. 36.

1889. *LIOCERAS DECIPIENS*, var. *SIMILE*, This Monogr., Pl. xv, figs. 1, 2.

Description.—Platyleptogyral, gradumbilicate, strii-parvicostate to lævigatae.

Locality and Stratum.—Dorset: Beaminster district, from the ironshot stone, equivalent in date to the Stoke Knap Building Stone.¹

Date of Existence.—*Bradfordensis* hemera, presumably.

6. *BRASILIA DECIPIENS* (*S. Buckman*). Plate XII, figs. 8, 9; Suppl., Plate XI, fig. 35; Fig. 43 in text.

1888. *LIOCERAS DECIPIENS*, This Monogr., Pl. xii, figs. 8, 9.

Description.—Platyleptogyral, excentri-gradumbilicate, lævigatae.

Note.—Small costæ are visible in the umbilicus.

Distinction.—From *Br. similis*, more compressed, more excentrumbilicate, smoother.

Note.—*Cosm. cirrata* is angustilobate, less carinate, begins the excentricity of umbilicus earlier.

Locality and Stratum.—Dorset: Sherborne, from the *Rhynchonella ringens* bed. In the type there is a specimen of that fossil imbedded.

Date of Existence.—*Bradfordensis* hemera.



FIG. 43.—Radial line of *Brasilia decipiens*.

7. *BRASILIA EFFRICATA*, *S. Buckman*. Plate VII, figs. 3, 4.

1888. *LIOCERAS AMBIGUUM*, This Monogr., Pl. vii, figs. 3, 4.

1902. *BRASILIA EFFRICATA*, Emend. Ann. Nom., p. 3.

Description.—Platyleptogyral, subexcentri-gradumbilicate, lævigatae.

Note.—Judging by a younger specimen, small costæ change to striæ before a diameter of 40 mm. is attained, and these soon become very faint. Excentricity of the umbilicus begins at about 80 mm. diameter.

Distinction.—From *Br. decipiens* greater compression, and a larger, though less excentric umbilicus.

¹ Better acquaintance with the lithic characters of the deposits in the Beaminster district enables me to say this.

Localities and Strata.—Dorset: Bradford Abbas with *Rhynchonella ringens*; “near Sherborne,” probably Ambers Hill; Stoke Knap, in the Building Stone (from Mr. Tutchet).

Date of Existence.—*Bradfordensis* hemera.

XXXI. Genus—BRASILINA, *S. Buckman*.

(Type: *Brasilina Tutcheri*, sp. n.)

1899. BRASILINA. This Monogr., Explan. Suppl., Pl. x, xi.

Definition.—Platyleptogyral, subangustumbilicate; densisepate, subbrevisublatilobate; laterally anguliradiate; peripherally subacutanguliradiate, fastigate, carinate.

Distinction.—From *Brasilina*, greater compression in proportion to umbilication.

Remarks.—It would have been desirable to make *Baylii* the type of the genus, as it seems preferable to choose the least retrogressive species of a series for that office; but there was the difficulty of obtaining details of the suture-line.



FIG. 44.—Radial line of *Brasilina Tutcheri*.

1. BRASILINA BAYLI (S. Buckman). Plate III, figs. 6, 7; Suppl., Plate XI, fig. 34.

1887. LUDWIGIA MURCHISONÆ, var. BAYLI, This Monogr., Pl. iii, fig. 6.

Description.—Platysubleptogyral, gradumbilicate, parvicostate.

Remarks.—So far as it can be observed the suture-line seems to show the subbrevisublatilobate character.

Distinction.—From *Am. Murchisonæ falcatus*, Quenstedt¹, a larger umbilicus and rather coarser costæ.

Note.—*Am. Murchisonæ falcatus* would seem to be another species of the same genus.

Locality and Stratum.—Dorset: Bradford Abbas, in the Paving Bed.

Date of Existence.—*Murchisonæ* or *Bradfordensis* hemera.

2. BRASILINA TUTCHERI, *S. Buckman*. Suppl., figs. 44, 45 in text.

Description.—Platyleptogyral, subconcavumbilicate, parvicostate to striate.

Distinction.—From *B. Baylii*, smaller umbilicus and less costation.

Localities and Strata.—Dorset: Stoke Knap, near Broad Windsor, evidently from the Building Stone (Mr. J. W. Tutchet); Bradford Abbas, from the Paving

¹ ‘Am. Schwäb. Jura,’ pl. lix, fig. 15.

somewhat



Series A—LUDWIGELLÆ VERÆ.

1. LUDWIGELLA IMPOLITA, *S. Buckman*. Suppl., Plate XIX, figs. 25—27.

Localities and Strata.—Dorset: Stoke Knap, in the Building Stone; Bradford Abbas, from a yellow marly bed, perhaps that above Paving Bed.

Date of Existence.—*Bradfordensis* hemera, perhaps.

2. LUDWIGELLA RUDIS (*S. Buckman*). Plate XV, figs. 11, 12 (type); fig. 13; Suppl., Fig. 47 in text.

1889. LUDWIGIA RUDIS, This Monogr., Pl. xv, figs. 11—13.

Distinction.—From *Ludl. impolita*, thinner, and not such coarse ornament.

Localities.—Dorset: Louse Hill;¹ near Halfway House, Sherborne; Somerset: North Coker.

Date of Existence.—*Bradfordensis* hemera, presumably.

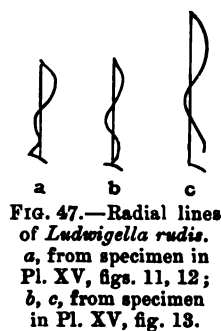


FIG. 47.—Radial lines of *Ludwigella rudis*. a, from specimen in Pl. XV, figs. 11, 12; b, c, from specimen in Pl. XV, fig. 13.

3. LUDWIGELLA ARCITENENS, *S. Buckman*. Plate IV, figs. 1, 2; Suppl., Fig. 46 in text.

1885. HILDOCERAS (LUDWIGIA) CORNU, *Haug*, Monogr. *Harp.*; Neues Jahrbuch Mineral., Beil.-Bd. iii, pl. xii, fig. 11.

1887. LUDWIGIA CORNU, This Monogr., Pl. iv, figs. 1, 2.

1902. LUDWIGELLA ARCITENENS, Emend. Amm. Nom., p. 4.

Distinction.—From *Ludl. rudis*, more compressed, and the less pronounced ornament.

Localities and Strata.—Dorset: Wyke Quarry; Halfway House, in the Blue Beds; Bradford Abbas, in lower part of Fossil Bed.

Date of Existence.—*Concavi* hemera.

4. LUDWIGELLA CORNU (*S. Buckman*). Plate IV, figs. 3, 4; Plate A, fig. 6; Suppl., Figs. 48—50 in text.

1887. LUDWIGIA CORNU, This Monogr., Pl. iv, figs. 3, 4; and see syn., p. 20, under year 1881.

Notes.—The specimen figured by my father is the one to which I first gave the name, so that is really the holotype. Accordingly I give a figure of it now, a reproduction of a photograph.

¹ Presumably Bed 8, 'Quart. Journ. Geol. Soc.,' vol. xlix, p. 489.

Distinction.—From *Ludl. arcitenens*, smaller umbilicus, less coarse ornament.

FIG. 48.

FIG. 49.

FIG. 50.



FIG. 48.—Radial line of *Ludwigella cornu*, from specimen in Pl. IV, figs. 3, 4.

FIGS. 49, 50.—*Ludwigella cornu*. Holotype. Bradford Abbas.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, lower part; Louse Hill; Sandford Lane, near Sherborne, in sandy stone.

Date of Existence.—*Concavi* hemera.

5. LUDWIGELLA CONCAVA (*J. Sowerby*). Plate II, figs. 5, 6; Plate VIII, figs. 1, 2; Suppl., Fig. 51 in text.

1815. AMMONITES CONCAVUS, *J. Sowerby*, Min. Conch., pl. xciv.

1887. LIOCERAS CONCAVUM, This Monogr., Pl. ii, figs. 6, 7; 1888, Pl. viii, figs. 1, 2.

1901. LUDWIGELLA CONCAVA, Proc. Cotteswold Club, vol. xiii, p. 266.

Description.—Platyleptogyral, concavumbilicate, subcostate.

Distinction.—From *Ludl. cornu*, the concavumbilicus.

Notes.—The umbilicus of Plate VIII, fig. 1, is quite incorrect.

The size of this specimen seems to be quite out of agreement with that of other *Ludwigellæ*. Perhaps the association with *Ludl. concava* is incorrect.

Localities and Strata.—Somerset: “Not a rare species in the neighbourhood of Ilminster”¹ (*Sowerby*’s specimen). Dorset: Bradford Abbas, in the lower part of the Fossil Bed with *Ludwigella arcitenens*, etc.; Stoke Knap, in the Building Stone.

Date of Existence.—*Concavi* hemera.

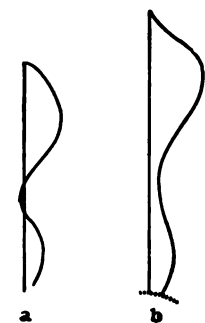


FIG. 51.—*Ludwigella concava*. a, from an impression kindly furnished by Mr. G. C. Crick, F.G.S., of the type specimen, Pl. II, figs. 6, 7; b, from specimen in Pl. VIII, figs. 1, 2.

¹ ‘Min. Conch.’ vol. i, p. 214. Ilminster is most likely a mistake for Yeovil. I have not found any *concauus* strata within miles of Ilminster. The localities of the two species in *Sowerby*’s Plate xciv were perhaps transposed.

Series B—LUDWIGELLÆ COMPRESSÆ.

A somewhat parallel series, more compressed and more umbilicate than the preceding.

6. LUDWIGELLA SUBRUDIS, *S. Buckman*. Plate XV, figs. 14, 15; Suppl., Fig. 52 in text.

1889. LUDWIGIA RUDIS, This Monogr., Pl. xv, figs. 14, 15.

1902. LUDWIGELLA SUBRUDIS, Emend. Amm. Nom., p. 4.

Distinction.—From *Ludl. rudis*, more compressed and more umbilicate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Sandford Lane, near Sherborne, grey sandstone.

Date of Existence.—*Concavi* hemera.



7. LUDWIGELLA ATTENUATA, *S. Buckman*. Suppl., Plate XIX, figs. 10—12.

Distinction.—From *Ludl. cornu*, more compressed and more umbilicate; from *L. subrudis*, less coarse ornament.

Localities and Strata.—Dorset: Bradford Abbas, in the lower part of the fossil bed; Halfway House, in the "Blue Beds."

Date of Existence.—*Concavi* hemera.

8. LUDWIGELLA TENUIS, *S. Buckman*. Suppl., Plate XX, figs. 37—39.

Remarks.—A thin, delicate, and elegant shell, easily separated from *Ludl. concava* by its more compressed whorls, less distinct costation, and more acute periphery.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone.

Date of Existence.—*Concavi* hemera, perhaps.

Series C—LUDWIGELLÆ PAUCICOSTATÆ.

The costæ are further apart and proportionately rather coarser than in Series A.

9. LUDWIGELLA ATTRACTA, *S. Buckman*. Suppl., Plate XIX, figs. 31—33.

Locality.—Dorset: Louse Hill, near Sherborne.

Date of Existence.—*Bradfordensis* hemera, presumably.

10. LUDWIGELLA BLANDA, *S. Buckman*. Suppl., Plate XIX, figs. 22—24.

Distinction.—From *Ludl. attracta*, smaller umbilicus, less ornament. It is a species parallel with, but presumably preceding, *L. cornu*, wherefrom it differs by stouter whorls, fewer though rather more marked ribs, and more costate umbilicus.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone.

Date of Existence.—*Bradfordensis* hemera, presumably.

11. LUDWIGELLA SUBOBSOLETA, *S. Buckman*. Suppl., Plate XIX, figs. 4—6.

Description.—Gradumbilicate, subobsoleticostate.

Remarks.—The small costæ are few and distant; they are almost obsolete inside the bend.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera, presumably.

Series D—LUDWIGELLÆ CURVÆ.

Similar to Series A, but the ornament coarser in proportion, and the radial line more curved.

12. LUDWIGELLA FLEXILIS, *S. Buckman*. Suppl., Plate XIX, figs. 28—30.

Remarks.—The inner whorls up to about 6 mm. diameter are smooth.

Distinction.—Is like young *Ludwigina patula*, but has more rounded, slightly thicker whorls, and a more fastigate periphery. The whorl of young *L. patula* is subquadrate with subtabulate periphery, that of *Ludl. flexilis* rounded with arched periphery. From *Ludl. impolita*, larger umbilicus.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone.

Date of Existence.—*Bradfordensis* hemera, presumably.

13. LUDWIGELLA CALLOSA, *S. Buckman*. Suppl., Plate XIX, figs. 16—18.

Distinction.—From *L. impolita*, thinner, and the more distant ornament is rather coarser.

Locality and Stratum.—Dorset: Sandford Lane, Sherborne (Bed 11, sect. ix, p. 493, 'Quart. Journ. Geol. Soc.,' vol. xlix, as "*Lud. rudis*").

Date of Existence.—*Concavi* hemera.

14. LUDWIGELLA VIBRATA, *S. Buckman*. Suppl., Plate XIX, fig. 13—15.

Distinction.—Something like *Ludl. subrudis*, but with more curved ribs.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Somerset: Stoford (Bed 11).

Date of Existence.—*Concavi* hemera.

15. LUDWIGELLA MICRA, *S. Buckman*. Suppl., Plate XIX, figs. 7—9.

Localities and Stratum.—Dorset: Louse Hill; Bradford Abbas, in the Fossil Bed.

Date of Existence.—*Concavi* hemera.

Series K—LUDWIGELLÆ PINGUES.

Somewhat stout whorls distinguish this series.

a. Biarciradiatæ.

Radial line in curves.

16. LUDWIGELLA GLEVENSI, *S. Buckman*. Suppl., Plate XX, figs. 25—27.

Locality and Stratum.—Gloucestershire, from the Cheltenham district, and evidently from the Pea-grit series, by attached matrix. Purchased from the collection of the late Dr. T. Wright, F.R.S.

Date of Existence.—*Murchisonæ* hemera.

17. LUDWIGELLA ARCUATA, *S. Buckman*. Suppl., Plate XX, figs. 28—30.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone. One specimen has exact position recorded; it is layer 6, that is the bottom.

Date of Existence.—*Bradfordensis* hemera.

18. LUDWIGELLA CASTA, *S. Buckman*. Suppl., Plate XX, figs. 31—33.

Note.—Costæ are mostly connate in pairs, in middle of lateral area. Lateral lappet is small and short.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone. A small specimen has the position recorded; it is 5, that is a layer above *Ludl. arcuata*.

Date of Existence.—*Concavi* hemera.

Note.—The three species, *L. glevensis*, *L. arcuata*, *L. casta*, are distinguished by showing a progressive decline in coarseness of costation, in size of umbilicus, and in compression. *L. glevensis* has a few rather distant coarse ribs in the umbilicus suggestive of the ornament of *L. impolita*.

β. Anguliradiatæ.

19. LUDWIGELLA RUGOSA, *S. Buckman*. Suppl., Plate XX, figs. 34—36.

Distinction.—From *Ludl. impolita*, more closely set, less conspicuous costæ, which show an angulate radial line.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone.

Date of Existence.—*Bradfordensis* hemera, perhaps.

Series F—LUDWIGELLÆ CARINATÆ.

A fairly distinctly separated carina and coarser ornament distinguish these species from Series E. They represent, however, two groups; one being somewhat thick-whorled with small umbilicus, the other more compressed, but with larger umbilicus.

20. LUDWIGELLA NODATA, *S. Buckman*. Suppl., Plate XIX, figs. 34—36.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone.

Date of Existence.—*Bradfordensis* hemera, presumably.

21. LUDWIGELLA CARINATA, *S. Buckman*. Suppl., Plate XIX, figs. 40—42.

Distinction.—From *Ludl. nodata*, a wider umbilicus, a more compressed whorl, and less conspicuous ornament.

Locality and Stratum.—Dorset: Stoke Knap, in the Building Stone (rather common)—more than one specimen has the exact layer recorded; it is 6; Bradford Abbas [marl of Paving Bed?] (Monk Collection).

Date of Existence.—*Bradfordensis* hemera.

Series G—LUDWIGELLÆ SUBRECTÆ.

Close-set and nearly straight ribs are the distinctions in this case.

22. LUDWIGELLA OPACA, *S. Buckman*. Suppl., Plate XIX, figs. 19—21.

Description.—Subplatysubleptogyral, sublatumbilicate; subparvicostate.

Localities and Strata.—The figured specimen is from my father's collection. It is mostly of a blackish colour from a dark calcareous matrix. I do not know the locality, unless it be Yorkshire; but the matrix is so distinctive that it should be recognisable by those acquainted with the strata. Dorset: Burton Bradstock, from

a grey matrix, but I do not know the horizon. This specimen is 26 mm. in diameter, and shows a lateral auricle, like so many of the other species.

Date of Existence.—Uncertain; *Murchisonæ* to *discitæ* hemera.

23. LUDWIGELLA MODICA, *S. Buckman*. Suppl., Plate XIX, figs. 37—39.

Description.—Platyleptogyral, sublatumbilicate; subspissi- and parvicostate, often connaticostate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

V-SCRIPTIRADIATE.

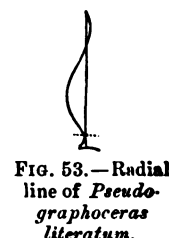
In the following genera the radial line has, on the lateral area, a noticeable V-form, made the more conspicuous by a want of projection on the periphery. Such a radial line is a kind of exaggeration of the tortiradiate feature; and just as that gradually changes, so this one develops to a biarcuate style. Generally, however, the V-script form is very persistent.

XXXIII. Genus—PSEUDOGRAPHOCERAS, *S. Buckman*.

(Type: *Pseudographoceras literatum*, sp. n.)

1899. PSEUDOGRAPHOCERAS. This Monogr., Explan. Suppl.
Pl. xi.

Definition.—Subplatysubleptogyral, sublatumbilicate; (subdensesepate, subbrevisublatilobate);¹ laterally anguliradiate; peripherally rectiradiate, tabulate, parvi-nonsepti-carinate.



1. PSEUDOGRAPHOCERAS LITERATUM, *S. Buckman*. Suppl., Plate XI, figs. 19—21.

Description.—Sublatumbilicate, costate.

Remarks.—The ribs are mostly bifurcate just inside the lateral angle. In size they are very regular, and though numerous they are rather prominent.

Localities and Strata.—Dorset: Bradford Abbas, from the Paving Bed; Chideock Quarry Hill, from the "Wild Bed."

Date of Existence.—*Murchisonæ* hemera.

2. PSEUDOGRAPHOCERAS DELETUM, *S. Buckman*. Suppl., Plate XI, figs. 22—24.

Description.—Subangustumbilicate, striate, parvi- becoming obsoleti-carinate.

Remarks.—The costate stage in a reduced form is seen at the beginning of the

¹ From a specimen of *Ps. deletum*.

last whorl of the figured specimen. Then there is the change to the striate stage. The carina, though small at the commencement of the last whorl, is distinct; it gradually becomes less so, and is finally a mere ridge on a subtabulate periphery.

Distinction.—There is no need to point out how it differs from *Psgr. literatum*; rather, attention may be directed to how it agrees in the radial curve, mode of costation, and general figure.

Locality and Stratum.—Dorset: Bradford Abbas, in a rather soft, yellow, iron-shot marl (two specimens, one passing a little towards next species).

Date of Existence.—*Bradfordensis* hemera, probably.

3. PSEUDOGRAPHOCERAS LIMATUM, *S. Buckman*. Suppl., Fig. 54 in text.



FIG. 54. — *Pseudographoceras limatum*.

Description.—Angustigradumbilicate, striate, obsoleticarinate.

Distinction.—From *P. deletum*, smaller umbilicus, earlier failure of costæ.

Note.—The tendency to increase the peripheral projection of the radial line noticeable in *P. deletum* is continued in this species.

Locality and Stratum.—Dorset: Stoke Knap in the Building Stone, layer 6.

Date of Existence.—*Bradfordensis* hemera.

PSEUDOGRAPHOCERAS ? sp. *Foreign*.

1886. HARPOCERAS, sp. indet., Vacek, Ool. Cap. S. Vigilio; Abh. k. k. geol. Reichsanstalt, Bd. xii, No. 3, pl. viii, fig. 1.

Remarks.—This is a foreign species of a series akin to *Pseudographoceras*. It has the V-script, and close-set, regular costæ, as well as the subdistinct carina like *P. literatum*, but it is more compressed and more umbilicate.

4. PSEUDOGRAPHOCERAS ? COMPRESSUM, *S. Buckman*. Plate XV, figs. 5, 6; Suppl., Plate XV, fig. 21.

1888. LIOCERAS CONCAVUM, var., This Monogr., Pl. xv, figs. 5, 6.

1902. PSEUDOGRAPHOCERAS COMPRESSUM, Emend. Amm. Nom., p. 5.

Description.—Subconcaumbilicate, parvicostate.

Remarks.—This species has some resemblance to the one figured by Vacek, dealt with in the last article, so far as the general shape and the direction of the costæ are concerned. But the style of ribbing is different—it is of a more distant pattern. So it is doubtful if this species is the involute mutation of Vacek's, or if it belongs strictly to the same series.

Locality and Stratum.—Dorset: Bradford Abbas, from the Fossil Bed.

Date of Existence.—*Concavi*, or *Discitæ* hemera.

5. PSEUDOGRAPHOCERAS ? CARINIFERUM, *S. Buckman*. Suppl., Plate XX, figs. 13—15.

Description.—Gradumbilicate, parvi- and spissicostate.

Remarks.—The umbilicus shows connaticostæ. This species has ornament of a similar character to that of *Pseudographoceras*, and to Vacek's species; but it is more compressed than any of the foregoing, and is distinguished by an elevated carina.

It is generically distinct from *P. literatum*; but as there is no other species close akin to be associated, it may retain this generic title for present convenience.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

XXXIV. Genus—PLATYGRAPHOCERAS, *S. Buckman*.

(Type: *Platygraphoceras apertum*, *S. Buckman*.)

1902. PLATYGRAPHOCERAS, Emend. Amm. Nom., p. 4.

Definition.—Platyleptogyral, subangustumbilicate; subdensi-septate, sublongiangustilobate; laterally anguliradiate; peripherally subrecti-radiate, subplanifastigate, subobsoleticarinate.

Distinction.—From *Pseudographoceras*, difference in proportions, difference in character of costation, subobsolete carina at all stages.

Remarks.—Definition and distinction apply only to the typical or paucicostate series.



FIG. 55.—Radial line of *Platygraphoceras apertum*.

A. PAUCICOSTATÆ.

1. *PLATYGRAPHOCERAS CARBATINUM*, *S. Buckman*. Suppl., Plate XX, figs. 16—18.

Description.—Subplaty-subpachygyral; ¹ sublatumbilicate; connaticostate, with nodate junctions.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

2. *PLATYGRAPHOCERAS LATUM*, *S. Buckman*. Suppl., Plate XX, figs. 19—21.

Description.—Subplaty-subleptogyral, sublatumbilicate, connaticostate.

Distinction.—From *P. carbatinum*, thinner and more closely costate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part, fairly common. Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera, presumably.

3. *PLATYGRAPHOCERAS APERTUM* (*S. Buckman*). Plate X, figs. 10, 11; Suppl., Plate XV, fig. 23; Fig. 55 in text.

1888. *LIOCERAS APERTUM*, This Monogr., Pl. x, figs. 10, 11.

1902. *PLATYGRAPHOCERAS APERTUM*, Emend. Amm. Nom., p. 4.

Description.—Platyleptogyral, gradumbilicate, semicostate, *i. e.* striicostate.

Distinction.—From *P. latum*, smaller umbilicus.

Remarks.—Young forms (25 to 40 mm. diameter), including therein those slightly more and slightly less umbilicate than the type, are common. They show pointed lateral lappets at different sizes: in one case the lappet is 8 mm. long and incomplete. No counterpart, however, of the type in size has been found.

Locality and Stratum.—Dorset: Bradford Abbas, from the Fossil Bed, presumably from the upper part. Stoke Knap, in the Building Stone.

Date of Existence.—*Discitæ* hemera, probably.

4. *PLATYGRAPHOCERAS*, sp. A. Plate XV, figs. 9, 10.

1889. *LIOCERAS APERTUM*, This Monogr., Pl. xv, figs. 9, 10.

This differs from type *P. apertum* in being thicker, having more gibbous-sided whorls, and stronger ribs.

Localities and Strata.—Dorset: Bradford Abbas, apparently lower part of Fossil Bed. Sandford Lane, near Sherborne, in greyish sandstone, below the *Hyperlioceras* horizon.

Date of Existence.—*Concavi* hemera.

FIG. 56.—Radial line of *Platygraphoceras*, sp. A.



¹ In this and other cases the difference of terms between the description of the species and the definition of the genus is due partly to the age of the specimen, and partly to the stage of specific development in relation to the species selected as the type of the genus.

B. SPISSICOSTATÆ.

5. *PLATYGRAPHOCERAS*? *COMPACTUM*, *S. Buckman*. Plate XV, figs. 3, 4; Plate A, fig. 17; Suppl., Fig. 57 in text.

1889. *LIOCERAS APERTUM*, This Monogr., Pl. xv, figs. 3, 4.

Description.—Gradumbilicate, spissiparvicostate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, upper part (common).

Date of Existence.—*Discitæ* hemera.



FIG. 57.—Radial lines of *Platygraphoceras*? *compactum*.

XXXV. Genus—*GRAPHOCERAS*,¹ *S. Buckman*.

(Type: *Graphoceras v-scriptum*, *S. Buckman*.)

1888. *LIOCERAS* (pars), This Monogr., p. 21.

1898. *GRAPHOCERAS*, *S. Buckman*. 'Jurassic Time;' Quart. Journ. Geol. Soc., vol. liv, p. 458.

Definition.—Platysubleptogyral, angustumbilicate; subdensiseptate, sublongi-latilobate; laterally anguliradiate; peripherally subrectiradiate, fastigate, paricarinatè.²

Remarks.—The broad V-shaped course of the radial line is a very noticeable feature. There is hardly any peripheral projection of the radial line.

Distinction.—Comparable only with *Pseudographoceras* and *Platygraphoceras* so far as the radial line is concerned. Separable from the former by the style of ornament, the paucicostation, wherein it agrees with the latter, but is distinct therefrom on account of less compression and less umbilication.

The species now ranged in this genus are capable of division into distinct groups.



FIG. 58.—Radial line of *Graphoceras v-scriptum*.

I. PARICARINATE.

a. *Subpaucicostate*.

1. *GRAPHOCERAS ROBUSTUM*, *S. Buckman*. Suppl., Plate XV, figs. 9—11.

Description.—Subconcaumbilicate, pauci-subcrassicostate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Concavi* hemera.

¹ Γράφος, a written character, a letter.

² Scarcely carinate; the term "obsoleticarinatè" might convey an idea of degeneration which may or may not be the case.

2. *GRAPHOCERAS V-SCRIPTUM*, *S. Buckman*. Plate X, figs. 5, 6; Plate A, fig. 16; Suppl., Plate XV, fig. 18; Fig. 58 in text.

1888. *LIOCERAS CONCAVUM*, var. *V-SCRIPTUM*, This Monogr., Pl. x, figs. 5, 6; 1889. Pl. A, fig. 16, p. 75 (pars).

Description.—Concavumbilicate, subcostate.

Distinction.—From *Gr. robustum*, the umbilicus is smaller, and the ribs are less conspicuous.

Localities and Strata.—Dorset; Bradford Abbas, Fossil Bed; Beaminster, from an ironshot matrix; Stoke Knap, from the Building Stone. Somerset: Stoford, from an ironshot matrix; Dundry, from the "Limestone and Marl beds."

Date of Existence.—*Concavi* hemera.

3. *GRAPHOCERAS DEBILE*, *S. Buckman*. Suppl., Plate XX, figs. 22—24.

Description.—Concavumbilicate, subcostate, declining to striate.

Distinction.—From other species, by a very small umbilicus and its general dwarfed form.

Remarks.—This is evidently a dwarf form, distinguished by its "old age in youth" appearance.

Locality and Horizon.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

β. *Subpissicostate*.

4. *GRAPHOCERAS LIMITATUM*, *S. Buckman*. Plate X, fig. 7 (type); Plate IX, fig. 7; Suppl., Plate XV, fig. 22.

1888. *LIOCERAS CONCAVUM*, var. *V-SCRIPTUM*, This Monogr., Pl. ix, fig. 7; Pl. x, fig. 7.

1902. *GRAPHOCERAS LIMITATUM*, Emend. Ann. Nom., p. 4.

Description.—Subgradumbilicate, parvicostate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

II. SUBCARINATE.

The character of the periphery is different; a small carina is raised on the fastigate area.

5. GRAPHOCERAS MIRABILE, *S. Buckman*. Suppl., Plate XV, figs. 12—14.

Description.—Subconcavumbilicate, pauci-subcrassicostate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed (Collection of Mr. D. Stephens). Somerset: Dundry, limestone and marl beds (Collection of Mr. E. Wilson), not so costate, leading towards *G. stigmatosum*.

Date of Existence.—Concavi hemera, perhaps.

6. GRAPHOCERAS STIGMATOSUM, *S. Buckman*. Plate IX, figs. 5, 6; Fig. 59 in text.

1888. LIOCERAS CONCAVUM, var. v-scriptum, This Monogr.,
Pl. ix, figs. 5, 6.

1902. GRAPHOCERAS STIGMATOSUM, Emend. Amm. Nom., p. 4.

Description.—Concavumbilicate, costate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Sandford Lane, near Sherborne, with *G. undulatum*.

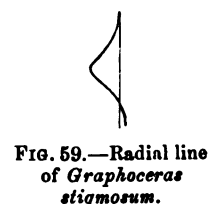


FIG. 59.—Radial line
of *Graphoceras*
stigmatosum.

7. GRAPHOCERAS aff. STIGMATOSUM. Plate IX, figs. 8—10.

1888. LIOCERAS CONCAVUM, abnormal form. This Monogr., Pl. ix, figs. 8—10.

Remarks.—Accompanying *G. stigmatosum* are specimens similar, but with a smaller umbilicus. In Pl. IX, fig. 8 is given a representation of the form.

The specimen is abnormal on one side. It may be noted that the abnormality is hypostrophic—a return to the wider umbilicus, and to the coarse costæ of the inner area seen in *G. robustum* and *G. mirabile*.

Localities and Strata.—As mentioned for *G. stigmatosum*; and Somerset: Dundry.

8. GRAPHOCERAS UNDULATUM, *S. Buckman*. Plate X, fig. 9; Plate A, fig. 19.

1888. LIOCERAS CONCAVUM, var., This Monogr., Pl. x, fig. 9; 1889, Pl. A,
fig. 19.

1902. GRAPHOCERAS UNDULATUM, Emend. Amm. Nom., p. 4.

Description.—Concavumbilicate, striicostate with median undulations.

Remarks.—In the middle of the lateral area, where the radii form their angles, are a series of wave-like bulgings, and from each of them proceed generally two of the costæ belonging to the outer area.

Distinction.—From any other species of the genus, the undulate character of the costæ on the median part of the lateral area.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed: the two largest specimens nearly 110 mm. in diameter; Sandford Lane, near Sherborne ('Q. J. G. S.,' vol. xlix, p. 493, sect. ix, bed 11 or 13).

Date of Existence.—Concavi hemera.

9. *GRAPHOCERAS FLACCIDUM*, *S. Buckman*. Plate VIII, figs. 7, 8; Suppl., Fig. 60 in text.

1888. *LIOCERAS CONCAVUM*, This Monogr., Pl. viii, figs. 7, 8.

1902. *GRAPHOCERAS FLACCIDUM*, Emend. Amm. Nom., p. 4.

Description.—Concavumbilicate, striiparvicostate, with obscure median undulations.

Remarks.—Along the median part of the lateral area are obscure bulgings after the pattern of those seen in *G. undulatum*. They are drawn too distinctly in the figure. The costæ of the outer area are also somewhat obscure. They are drawn rather too distinct, and certainly too numerous in the figure.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.



FIG. 60.—Radial line of *Graphoceras flaccidum*.

10. *GRAPHOCERAS* ? *INCLUSUM*, *S. Buckman*. Suppl., Plate XV, figs. 15—17.

Description.—Concavumbilicate, subcostate to stricostate.

Distinction.—From similar species of the genus, the decidedly smaller umbilicus.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Frogden Quarry, Sherborne ('Q. J. G. S.', vol. xlix, p. 500, sect. xv, bed 14. This bed is entered as *concavi* hemera, but compare fossils with sect. ix, bed 9).

Date of Existence.—*Discitæ* hemera.

11. *GRAPHOCERAS* ? *DECORUM*, *S. Buckman*. Plate VIII, figs. 3, 4; Suppl., Plate XV, fig. 19.

1888. *LIOCERAS CONCAVUM*, This Monogr., Pl. viii, figs. 3, 4, only.

1902. *GRAPHOCERAS DECORUM*, Emend. Amm. Nom., p. 3.

Description.—Subconcavumbilicate, densiparvicostate.

Distinction.—From *G. inclusum*, the more open, not truly concave umbilicus; the more numerous ribs.

The genus *Graphoceras* contains many examples of what may be called *concavus*-like species—platyleptogyral forms with the little basin-shaped umbilicus, made by the regular superposition of the concave inner margins. There are many more examples of these *concavus*-like or concavumbilicate species, but to describe all these forms adequately would swell this already large Supplement to an inordinate length. Sufficient has been done for the present to show that these concavumbilicate forms are polygenetic, distinguishable from one another not by shape, but by the curves of the radial lines; that they are, in fact, the terminals of different grad-

umbilicate stocks, whereof the majority are recognisable by their characteristic radial lines. Of certain concavumbilicate forms the gradumbilicate species are not known. Still some of such concavumbilicate species have been described, *Graphoceras* is a case in point; but others have not been described, because, lacking the distinctness of *Graphoceras*, they are difficult to classify until their gradumbilicate connections are known. On the other hand, to certain gradumbilicate species the angustumbilicate terminals have not been allotted; some of the undescribed concavumbilicate species will probably be found to be these required angustumbilicate terminals. This is a matter for future work; neither time nor space permits full investigation now, while so many families of Inferior Oolite Ammonites remain untouched.

XXXVI. Genus—BRAUNSINA, *S. Buckman*.

(Type: *Braunsina contorta*, sp. n.)

1902. BRAUNSINA, Emend. Amm. Nom., p. 3.

Definition.—Platyleptogyral, sublatumbilicate; subdensiseptate, sublongi-subangustilobate; laterally anguliradiate; peripherally anguliradiate (increasingly acute), fastigate, parvicarinate.

Distinction.—From *Pseudographoceras*, the persistence of the costæ and the fastigate periphery. The latter character and the less V-script radial line are features of distinction from *Platygraphoceras*. From *Graphoceras*, the less V-script line, and the relatively larger umbilicus.



FIG. 62.—Radial lines of *Braunsina contorta*.

1. BRAUNSINA ASPERA, *S. Buckman*. Suppl., Plate XVII, figs. 13—15.

Description.—Subplaty-subpachygyral, costate (not adult?).

Note.—In some cases the costæ are connate, in pairs, on the inner margin.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

2. BRAUNSINA CONTORTA, *S. Buckman*. Suppl., Plate XVII, figs. 16—18.

Description.—Costate to subcostate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

3. *BRAUNSINA CORNIGERA*, *S. Buckman*. Suppl., Plate XX, figs. 4—6.

Description.—Gradumbilicate, costate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera, presumably.

In species 4 to 7 connate costæ are more in evidence than in species 2 and 3. *Braunsina elegantula* is stouter whorled and more distinctly costate than *B. cornigera*; its costæ are also more definitely V-script.

4. *BRAUNSINA ELEGANTULA*, *S. Buckman*. Suppl., Plate XIX, figs. 1—3.

Description.—Gradumbilicate, connaticostate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

5. *BRAUNSINA PROJECTA*, *S. Buckman*. Suppl., Plate XX, figs. 7—9.

Description.—Subconcaumbilicate, subparvicostate.

Remarks.—The umbilicus shows ornament of the connaticostate character.

Distinction.—From *B. elegantula*, smaller umbilicus, less pronounced ornament.

Localities and Strata.—Somerset: "Dundry Hill, West End," from E. Wilson, from upper part grey Limestone and Marl Beds, about Nos. 10 to 13, 'Q. J. G. S.,' vol. lii, p. 677. Gloucestershire: Cheltenham district, evidently from the Lower *Trigonia*-grit. It is from my father's collection, and is marked "*A. canaliculatus*, Bronn," which, however, is entered in 'Geol. Cheltenham,' ed. 2, p. 89, as from Middle Lias, Dumbleton: that is certainly a mistake.

Date of Existence.—*Discitæ* hemera.

6. *BRAUNSINA FASTIGATA*, *S. Buckman*. Suppl., Plate XX, figs. 1—3.

Description.—Subconcaumbilicate, parvicostate.

Distinction.—From *B. projecta*, rather more compression, much smaller ornamentation.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera.

Radial line very angulate.

7. *BRAUNSINA* ? *ANGULIFERA*, *S. Buckman*. Plate XV, figs. 16, 17; Fig. 63 in text.

1889. *LUDWIGIA RUDIS*, This Monogr., Pl. xv, figs. 16, 17.

1902. *BRAUNSINA* ? *ANGULIFERA*, Emend. *Amm. Nom.*, p. 3.

Description.—Sublatumbilicate, costate.

Distinction.—From *B. elegantula*, more umbilicate, more compressed.

Localities and Strata.—Dorset: presumably Halfway House; Bradford Abbas, Fossil Bed, upper part; and a small specimen labelled Beaminster. Somerset: Stoford, from a brownish matrix.

Date of Existence.—*Discitæ* hemera.



FIG. 63.—Radial line of *Braunsina* ? *angulifera*.

The two following species, which have several characters in common, do not belong to *Braunsina*. They are only placed here because the material for examination is insufficient for a proper definition. The common characters are as follows:—subplaty-subleptogyral, latumbilicate, laterally anguliradiate, peripherally rectiradiate, subtabulate. In other words, subquadrate whorls, V-script ribs, open umbilicus, flattened periphery, are the common features. The first species is more coarsely costate than the other.

8. *BRAUNSINA* ? *SUBQUADRATA*, *S. Buckman*. Suppl., Plate XX, figs. 10—12.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

9. *BRAUNSINA* ? *FUTILIS*, *S. Buckman*. Plate XV, figs. 7, 8; Suppl., Fig. 64 in text.

1889. *LIOCERAS APERTUM*, This Monogr., Pl. xv, figs. 7, 8.

1902. *BRAUNSINA FUTILIS*, Emend. *Amm. Nom.*, p. 3.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.



FIG. 64.—Radial line of *Braunsina* ? *futilis*.

Levigation pronounced.

The species of the two next genera show somewhat rapid decline of costæ, and consequently a marked levigate stage, resembling in this matter *Pseudographoceras*, which has, however, more of a striate stage.

A. Sublatumbilicate.

XXXVII. Genus—BRAUNSELLA, *S. Buckman*.(Type: *Braunsella semilenis*, sp. n.)

1902. BRAUNSLIA, Emend. Amm. Nom., p. 3.

Definition.—Platysubleptogyral, sublatumbilicate; laterally anguliradiate; peripherally subrectiradiate, subtabulate, parvicarinate.

Distinction.—From other V-script genera by smoothness appearing while the species are sublatumbilicate. In *Pseudograploceras*, which is stouter and less umbilicate, smoothness is not present till angustumbilication is attained.

Remarks.—The name has to be changed on account of prior use.



1. BRAUNSELLA SEMILENIS, *S. Buckman*. Suppl., Plate XVII, figs. 19—21.

Description.—Costate to levigate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

2. BRAUNSELLA LENIS (*S. Buckman*). Plate VII, figs. 5, 6; Suppl., Plate XVII, fig. 32.

1888. LIOCERAS AMBIGUUM, This Monogr., Pl. vii, figs. 5, 6, only.

1902. BRAUNSLIA LENIS, Emend. Amm. Nom., p. 3.

Description.—Subcostate to levigate.

Distinction.—From *B. semilenis*, a smaller umbilicus and smoother whorls.

Remarks.—Confounded with *Ludwigia* (olim *Lioceras*) *ambigua*, but is far more umbilicate and has a different radial line.

Localities and Strata.—Dorset: Bradford Abbas, perhaps from Fossil Bed, upper part, and the idea of Paving Bed erroneous. Somerset: Dundry (E. Wilson), evidently from beds below "White Ironshot;" specimen 78 mm. in diameter, wholly septate, but from indications it must have been of a diameter of nearly 130 mm.

Date of Existence.—*Discitæ* hemera, perhaps.

3. BRAUNSELLA ? ROTABILIS, *S. Buckman*. Suppl., Plate XVII, figs. 7—9.

Description.—Subplaty-subleptogyral; sublatumbilicate; costate, seldom conaticostate; periphery subtabulate, parvicarinate.

Remarks.—A morphic equivalent of *B. semilenis*, but more compressed, and with a less angulate radial line. That, in its series, costæ would fail rapidly as in *Braunsella* may be doubted: hence the query after the generic name.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

B. Angustumbilicate.

(More or less.)

XXXVIII. Genus—REYNESIA, S. Buckman.

(Type: *Reynesia intermedia*, S. Buckman.)

1902. REYNESIA, Emend. Amm. Nom., p. 5.

Definition.—Platysubleptogyral; subangustumbilicate; laterally anguliradiate; peripherally anguliradiate (increasingly acute), convexifastigate, parvicarinate. (Radial line, fig. 65, p. clxv.)

Distinction.—From *Braunsella* and *Pseudographoceras*, radial line, more definitely carinate periphery; and, from the former, relatively smaller umbilication. From *Braunsina*, the radial line, the carina more definitely separated, the earlier failure of costæ.

a. Convexifastigate.

1. REYNESIA AMENA, S. Buckman. Suppl., Plate XX, figs. 40—42.

Description.—Sublatumbilicate, costate.

Distinction.—From *Braunsina contorta*, stouter whorls with more convex sides and periphery, area around umbilicus more compressed, earlier decline of costæ.

Locality and Strata.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

2. REYNESIA INTERMEDIA (S. Buckman). Plate XI, figs. 2, 3; Suppl., Plate XVIII, fig. 27.

1888. LIOCERAS DECIPIENS, var. INTERMEDIUM, This Monogr., Pl. xi, figs. 2, 3.

1902. REYNESIA INTERMEDIA, Emend. Amm. Nom., p. 5.

Description.—Subangustumbilicate; subcostate to levigate.

Distinction.—From *R. amæna*, smaller umbilicus.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Somerset: Dundry, "limestone and marl beds."

Date of Existence.—*Discitæ* hemera.

β. Subtabulate.

3. REYNESIA LAXA, S. Buckman. Plate XI, figs. 6, 7; Suppl., Plate XVIII, fig. 28.

1888. LIOCERAS DECIPIENS, var. INTERMEDIUM B, This Monogr., Pl. xi, figs. 6, 7.

1902. REYNESIA LAXA, Emend. Amm. Nom., p. 5.

Description.—Subangustumbilicate, subcostate, striicostate to smooth.

Distinction.—From *R. intermedia*, a larger umbilicus, rather less costate; more persistent costæ on the whorl.

Localities of Strata.—Dorset: Bradford Abbas, Fossil Bed; Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera, presumably.

4. REYNESIA CÆLA, *S. Buckman*. Plate XVI, figs. 10, 11; Suppl., Plate XVIII, fig. 26.

1889. HYPERLIOCERAS WALKERI, *This Monogr.*, Pl. xvi, figs. 10, 11 only.

1902. REYNESIA CÆLA, *Emend. Amm. Nom.*, p. 5.

Description.—Angustumbilicate; subcostate.

Distinction.—From *R. laxa*, a smaller umbilicus, also the costæ are rather more distinct, especially on the inner part of the whorl.

Remarks.—A possible angustumbilicate development of *R. laxa*; but the association may not be justified.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Gloucestershire: Frith Quarry, near Stroud, Lower *Trigonia*-grit.

Date of Existence.—*Discitæ* hemera.

5. REYNESIA LEPIDA, *S. Buckman*. Plate XI, figs. 4, 5; Suppl., Plate XVIII, fig. 29.

1888. LIOCERAS DECIPIENS, *var. INTERMEDIUM A*, *This Monogr.*, Pl. xi, figs. 4, 5.

1902. REYNESIA LEPIDA, *Emend. Amm. Nom.*, p. 5.

Description.—Subangustumbilicate, levigate.

Distinction.—From *R. laxa*, the greater smoothness.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

6. REYNESIA FURCILLATA, *S. Buckman*. Suppl., Plate XXII, figs. 1—3.

Description.—Platy-subleptogyral; subangustumbilicate; connaticostate, costæ declining in strength.

Remarks.—The umbilication and ornament suggest that this species represents the costate, more umbilicate, relative of *R. benigna*. Against this are the small carina and the less flexed radial-line.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

7. REYNESIA BENIGNA, *S. Buckman*. Suppl., Plate XXII, figs. 10—12.

Description.—Parvicostate, subexcentrumbilicate, compressed around umbilicus.

Distinction.—From *R. laza*, less marked, less persistent costæ; from *R. lepidæ*, more persistent costæ; from both, less concentric umbilicus, less distinct carina.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

CARINATITABULATE.

In the series of genera now to be described the carinatitabulate periphery is a particular feature of distinction. It is more distinct than the term implies, because the peripheral area is not only flat, but it is, even in the costate stage, levigate—the periphery appears as a flat, smooth band, fairly defined from the lateral area, and on this band is set a more or less prominent carina. The ribs end somewhat abruptly at the edge of this smooth band, and this smoothness forms a distinction from tabulate peripheries formerly noted: such peripheries are costate. Therefore the term would in the present case be more correctly “carinati- and levigati-tabulate.”

Another distinction about this tabulate periphery is its persistence. In other cases the tabulate periphery changes to fastigate, especially as degeneration proceeds and the periphery narrows—there being a falling in of the angle between the lateral and peripheral areas. In the present case the tabulation remains until the periphery is extremely acute; the angle between the lateral and peripheral areas being well maintained, often the increased compression rather accentuates the angle than otherwise.

The carina on the tabulate periphery is found in all degrees of development, from the barely distinct median ridge of *Darellella* to the pronounced alticarina of *Toxolioceras*. In the genera where the carina is much developed, the peripheral area looks very like the tongued edge of a matched board.

When the carina declines, the tabulate passes to the rounded periphery, without any very distinct fastigate stage.

The relative size of the carina forms a feature of distinction among the following genera; and to a certain degree it has been used in their grouping. But for the more complete systematic arrangement other features have been taken into account; because owing to the different sizes of the specimens and the allowance that has to be made for keel degeneration, the relative sizes of the carina, when their degrees of differences are not very pronounced, is difficult of comparison and not easy of description. For the latter purpose the following terms

are employed: Parvi-, distincti-, subalti-, and alticarinata. These must be qualified thus: subject to old age of individual or race.

Note.—In above remarks “tabulate” includes “penetabulate.” True tabulation of the area, at exact right angles to the keel line, is, of course, hardly found. A slight departure therefrom may be included as “tabulate,” a little further departure from rectangularity as “penetabulate,” the separation between lateral and peripheral areas being fairly maintained; while “subtabulate” denotes a flattish area with the separation not so distinct.

Parvicarinata.

XL. Genus—DARELLINA, *S. Buckman.*

(Type: *Darellina planaris*, sp. n.)

Definition.—Platyleptogyral, sublatumbilicate; subdensiseptate, sublongi-subangustilobate; laterally latanguliradiate; peripherally anguliradiate (increasingly acute),¹ penetabulate, parvicarinata. (Radial line, Fig. 66, p. clxv.)

Remarks.—The plate-like form and wide, shallow umbilicus are features specially distinctive of this genus. The radial line is biarcuate, becoming increasingly so with age. Species biogenetically earlier than the type might show a V-script line.

1. DARELLINA PLANARIS, *S. Buckman.* Suppl., Plate XVII, figs. 22—24 (Type); Plate XXII, figs. 7—9.

Description.—Sublatumbilicate, costate to levigate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

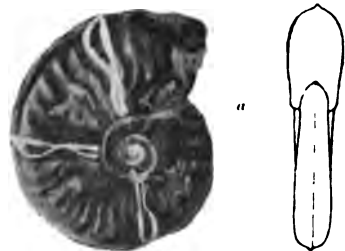


FIG. 67.—*Darellina dorsetensis*, Bradford Abbas.

2. DARELLINA DORSETENSIS, *S. Buckman.* Suppl., Fig. 67.

Description.—Subangustumbilicate, parvicostate, occasionally connaticostate.

Distinction.—From *D. planaris*, a smaller umbilicus and smaller costæ.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed; Stoke Knap, Building Stone, layer 3.

Date of Existence.—*Discitæ* hemera.

¹ Increase of rostration during development alters the radial line considerably; it changes from latangulate at end of costate stage to biarcuate in levigate stage.

3. DARELLINA (?) DOCILIS, *S. Buckman*. Suppl., Plate XXII, figs. 4—6.

Description.—Subangustumbilicate, parvi- and subpissicostate, connaticostate, costæ declining.

Remarks.—Radial line like that of *Darellina*, but less distinctly biarcuate; costæ more numerous and more distinctly connate; whorls less compressed. More numerous costate and more distinctly carinate than *Reynesia furcillata*.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

XLI. Genus—DARELLELLA, *S. Buckman*.

(Type: *Darellella recticostata*, sp. n.)

Definition.—Like *Darellina*, but the radial line almost coincides with the guide line, the costæ being noticeably straight. (Radial line, fig. 68, p. clxv.)

DARELLELLA RECTICOSTATA, *S. Buckman*. Suppl., Plate XVII, figs. 10—12.

Remarks.—This is one of the most distinct species of the Bradford Abbas Fossil Bed; its straight ribs, with so little peripheral projection, are an unusual feature among the Hildoceratidæ. Twenty years ago I recognised this species as new, but I have not figured it before on account of doubts as to its affinities. It is a rare form, not simply scarce because easily confounded as others may be. Only a few specimens much smaller than the figured example have rewarded diligent search.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

Distincticarinate.

In the following genera the carina stands out definitely from the tabulate periphery. Gerontic decline may affect its prominence somewhat, as in *Edania*.

Falcate to biarcuate.

Body-chamber has a tendency to thicken.

Angustumbilicate.

XLII. Genus—CEDANIA,¹ *S. Buckman*.

(Type: *Cedania falcigera*, sp. n.)

Definition.—Platysubleptogyral, angustumbilicate; laterally anguliradiate; peripherally anguliradiate, tabulate, distincticarinate. (Radial line, fig. 69, p. clxv.)

¹ 'Οἰδύρω, to swell, in reference to the body-chamber.

Remarks.—A swelling or inflation of the body-chamber characterises the species of this genus; hence the name. The carina tends to decline on the swollen body-chamber, both this decline and the swelling whorls being really atavic features. The radial line is somewhat falcate to more or less biarcuate.

1. *ÆDANIA INFLATA*, *S. Buckman*. Suppl., Plate XXI, figs. 13—15.

Description.—Gradumbilicate, costate.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

2. *ÆDANIA DELICATA*, *S. Buckman*. Suppl., Plate XXI, figs. 10—12.

Description.—Gradumbilicate, subcostate.

Distinction.—From *Æd. inflata*, smaller ornament.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

3. *ÆDANIA LEPTA*, *S. Buckman*. Suppl., Plate XXI, figs. 4—6.

Description.—Gradumbilicate parvidensicostate.

Distinction.—From *Æd. delicata*, smaller umbilicus, closer set, smaller costæ.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, not uncommon; Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera.

4. *ÆDANIA FALCIGERA*, *S. Buckman*. Suppl., Plate XXI, figs. 1—3a.

Description.—Subgradumbilicate, obsolete-parvicostate to striate.

Distinction.—From *Æd. leptæ*, the more distant costæ.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

5. *ÆDANIA PARVICOSTATA*, *S. Buckman*. Suppl., Plate XXI, figs. 7—9a.

Description.—Subgradumbilicate, parvisubspissicostate.

Distinction.—From *Æd. falcigera*, more numerous costæ which are more per-

sistent; a slightly smaller umbilicus. From *Æd. lepta*, more distant, more distinct costæ.

Localities and Strata.—Somerset: Dundry, Limestone and Marl Beds; not uncommon; 1 specimen marked horizon 4, *i.e.* counting down from *Sauzei* (see 'Quart. Journ. Geol. Soc.,' vol. lii, p. 681). Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

Subfalcate to subarcuate.

Body-chamber has a slight tendency to thicken.

XLIII. Genus—REYNESELLA, *S. Buckman*.

(Type: *Reynesella juncta*, sp. n.)

1902. REYNESELLA, Emend. Amm. Nom., p. 5.

Description.—Subplatysubleptogyral, sublatumbilicate; laterally flexiradiate; peripherally subacutanguliradiate, penetabulate, distincticarinate. (Radial line, fig. 70, p. clxv.)

Distinction.—From *Darellella*, the flexed radial line, and the more distinct carina.

Remarks.—The umbilicus is smaller relatively to development, and the joined costæ are a distinct feature, both characters of separation from *Darellella*.

1. REYNESELLA JUNCTA, *S. Buckman*. Suppl., Plate XVII, figs. 4—6.

Description.—Sublatumbilicate; costate; many costæ connate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; 'Stoke Knap, Building Stone, near the top. Somerset: Dundry, Limestone and Marl Beds (E. Wilson).

Date of Existence.—*Discitæ* hemera.

2. REYNESELLA PIODES, *S. Buckman*. Plate XVI, figs. 7, 8 (Type), fig. 9; Suppl., Plate XVIII, figs. 24, 25.

1889. HYPERLIOCERAS WALKERI, This Monogr., Pl. xvi, figs. 7—9.

1902. REYNESELLA PIODES, Emend. Amm. Nom., p. 5.

Description.—Subangustumbilicate; subcostate to parvicostate.

Distinction.—From *R. juncta*, a rather smaller, less costate, umbilicus; less coarse costæ.

Remarks.—A tendency to plump up the body-chamber is seen in figs. 7, 8, Plate XVI.

Corrections.—Plate XVI, fig. 7, umbilicus is shown too concentric; the penultimate whorl should be broader. Fig. 8, carina at top is too prominent.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Stoke Knap, Building Stone, layer 3.

Date of Existence.—*Discitæ* hemera.

3. REYNESELLA INOPS, *S. Buckman*. Suppl., Plate XXI, figs. 37—39.

Description.—Subangustumbilicate; parvicostate to obscuricostate.

Distinction.—From *Reynesella piodes*, smaller ornamentation.

Localities and Strata.—Dorset: Stoke Knap, near Broad Windsor, Building Stone; Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

4. REYNESELLA ? RODBURGENSIS, *S. Buckman*. Suppl., Plate XVII, figs. 1—3.

Description.—Subangustumbilicate; costate to subcostate; many connaticostæ, particularly in the umbilicus; distinct carina, declining on body-chamber.

Distinction.—From *R. juncta*; stouter whorls, a smaller umbilicus, more conspicuous, rather more distant, costæ.

Remarks.—In ornament the species has much the appearance of *Reynesella*, but the build of the whorls indicates a different stock.

Localities and Strata.—Gloucestershire: Rodborough Hill, near Stroud, Lower *Trigonia*-grit, 1 foot 10 inches from base. Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

5. REYNESELLA ? LINEATA, *S. Buckman*. Suppl., Plate XVII, figs. 25—27.

Description.—Parvicostate, the costæ mostly bifurcate; gradumbilicate; periphery subtabulate, distincticarinate.

Remarks.—Like *R. inops*, but the radial line is more curved and more projected peripherally. The costæ are less distinct in the umbilicus, but they remain more persistent. The umbilicus is slightly less concentric; the periphery is less distinctly tabulate, the angle between lateral area and periphery being less definite.

Locality and Stratum.—Dorset: Bradford Abbas, in the Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

Subalticarinata.

The carina stands out more prominently than in the genera of the distincti-carinate division.

Falcate.

XLIV. *Genus*—HUGIA,¹ *S. Buckman.*

(Type: *Hugia curva*, sp. n.)

Definition.—Platyleptogyral, angustumbilicate; subbrevisubangustilobate; laterally flexiradiate; peripherally subacutanguliradiate, tabulate, subalticarinata. (Radial line, fig. 71, p. clxv.)

Distinction.—Like *Reynesella*, but more strongly carinate and less umbilicate.

1. HUGIA CURVA, *S. Buckman.* Suppl., Plate XVIII, figs. 19—21*a* (Type); Suppl., Plate XXI, figs. 25—27.

Description.—Parvicostate, connaticostate, but the connate portion of the costæ not prominent.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, upper part.

Date of Existence.—*Discitæ* hemera.

2. HUGIA MICCA, *S. Buckman.* Suppl., Plate XXI, figs. 28—30.

Description.—Obscuricostate, passing towards levigate.

Distinction.—From *H. curva*, decline of ornament.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

Biarciradiata; subspissicostate.

XLV. *Genus*—LOPADOCERAS,² *S. Buckman.*

(Type: *Lopadoceras arcuatum*, sp. n.)

Definition.—Platyleptogyral subangustumbilicate; laterally arciradiata; peripherally sublatanguliradiata, penetabulate, subalticarinata. (Radial line, fig. 72, p. clxv.)

¹ In compliment to Dr. Otto Hug.

² Λοπάς, a flat dish.

Distinction.—From *Hugia*, biarcuate pattern of radial line, costation closer and more persistent.

1. LOPADOCERAS FURCATUM, *S. Buckman*. Suppl., Plate XXI, figs. 16—18.

Description.—Sublatumbilicate subspissicostate, mostly connaticostæ.

Remarks.—This species is the morphic equivalent of *Reynesella juncta*, but is particularly distinguished therefrom by the stouter whorls, especially round the umbilicus, also by the more numerous ribs.

Locality and Stratum.—Dorset: Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera, presumably.

2. LOPADOCERAS ARCUATUM, *S. Buckman*. Suppl., Plate XXI, figs. 19—21.

Description.—Spissisubcostate, with tendency towards parvicostate.

Localities and Strata.—Dorset: Stoke Knap, Building Stone, some specimens *in situ*, layer 3; Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

3. LOPADOCERAS EUIDES, *S. Buckman*. Suppl., Plate XXI, figs. 22—24.

Description.—Spissi-parvicostate, with tendency to striation.

Distinction.—From *L. arcuatum*, the decline of ornament.

Localities and Strata.—Dorset: Stoke Knap, Building Stone, some specimens *in situ*, layer 3; Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

Carina Variable.

Distincticarinata (type series).

Subalticarinata (similar series).

XLVI. Genus—DARELLIA,¹ *S. Buckman*.

(Type: *Darellia semicostata*, *S. Buckman*.)

1898. DARELLIA, *S. Buckman*, 'Jurassic Time'; Quart. Journ. Geol. Soc., vol. liv, p. 459.

¹ In honour of Mr. Darell Stephens, F.G.S., whose assiduous collecting has added so many new species to the Dorset fauna. Since this was written he has taken the surname of Darell.

Definition.—Platy-subleptogyral,¹ subangustumbilicate (subdensiseptate, subbrevi-subangustilobate)²; laterally arciradiate; peripherally sublatanguliradiate, tabulate, distincticarinata. (Radial line, Fig. 73, p. clxv.)

Distinction.—From *Lopadoceras*, which has a similar biarcuate radial line—costate stage is coarser, but less persistent, decline to levigate stage being rapid; build of whorls rather stouter, carina less distinct.

1. DARELLIA SEMICOSTATA, *S. Buckman*. Plate XII, figs. 10, 11; Suppl., Plate XVIII, fig. 30.

1888. LIOCERAS DECIPIENS, var. INTERMEDIUM, This Monogr., Pl. xii, figs. 10, 11.

1898. DARELLIA SEMICOSTATA, *S. Buckman*, 'Jurassic Time'; Quart. Journ. Geol. Soc., vol. liv, p. 459.

Description.—Costati-gradumbilicate, parvicostate to levigate.

Note.—The carina becomes less prominent after about 55 mm. diameter.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Somerset: Dundry, Limestone and Marl Beds (E. Wilson).

Date of Existence.—*Discitæ* hemera, presumably.

2. DARELLIA LEVIS, *S. Buckman*. Plate XVIII, figs. 4, 5; Suppl., Fig. 74, p. clxv, Fig. 75 in text.

1889. HYPERLIOCERAS DISCITES, This Monogr., Pl. xviii, figs. 4, 5 only.

1902. DARELLIA LEVIS, Emend. Amm. Nom., p. 3.

Description.—Subgradumbilicate; obsoleticostate to levigate.

Note.—There are costæ in the umbilicus, indicating a costate stage in youth.

Remarks.—Radial line and general details agree with *D. semicostata*, but the thickness is actually greater; so that, proportionately to umbilication it is much more. This would throw doubt on its being an angustumbilicate derivative from *D. semicostata*.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.



FIG. 75.—Suture line of *Darellia levis*.

3. DARELLIA TOXERES, *S. Buckman*. Suppl., Plate XVIII, figs. 13—15.

Description.—Angustumbilicate, levigate.

Distinction.—From *D. semicostata*, smaller umbilicus.

¹ Almost leptogyral.

² Seen obscurely through test of *D. semicostata*.

Locality and Stratum.—Dorset : Stoke Knap, Building Stone, layer 3.

Date of Existence.—*Discitæ* hemera.

4. DARELLIA CONCINNA, *S. Buckman*. Suppl., Plate XVIII, figs. 16—18.

Description.—Subconcaumbilicate, levigate.

Distinction.—From *D. toxeres*, the smaller umbilicus.

Locality and Strata.—Dorset : Bradford Abbas, Fossil Bed, upper part.
Somerset : Dundry, Limestone and Marl Beds.

Date of Existence.—*Discitæ* hemera.

In the next species the radial line is less regularly biarcuate, tabulation of periphery is more pronounced, and the carina is more prominent (subalticinate).

5. DARELLIA (?) POLITA, *S. Buckman*. Plate XVI, figs. 3, 4, (Type); figs. 5, 6;
Suppl., Plate XVIII, fig. 31.

1889. HYPERLIOCEBAS WALKERI, This Monogr., Pl. xvi, figs. 3—6 (not figs. 1, 2, 7—11).

1898. DARELLIA POLITA, *S. Buckman*, 'Jurassic Time'; Quart. Journ. Geol. Soc., vol. liv, p. 459.

Description.—Angustumbilicate; costate to semicostate and to levigate.

Remarks.—The example figured in Plate XVI, figs. 5, 6, does not agree with the type in umbilication, and ought, perhaps, to be distinguished as a separate species.

The largest example of this species in my cabinet measures 110 mm. incomplete; it attained a size of 135 mm. It is very like *Toxolioceras Walkeri* (Pl. XVI, figs. 1, 2) in general appearance, but distinguishable by a narrower periphery.

Localities and Strata.—Dorset : Bradford Abbas, Fossil Bed; Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera.

Subalticinate, with tendency to decline.

Relatively stout whorls.

The two following genera differ from any of the preceding carinatitabulate series, in the stouter proportions of the whorls, and in their radial lines; these characters suggest relationship with the genera *Lucya* and *Depaoceras*.

The genera are distinguished from each other (1) by the radial line, of which

the outer part is so much more bowed in *Deltoidoceras*, (2) by the cross section—in *Deltoidoceras*, subtriangulate, in *Dissoroceras*, subquadrate; (3) by earlier decline of costate stage in *Dissoroceras*.

The character of the periphery enables these genera to be separated from *Lucya* and *Depaoceras*; but this character is not inconsistent with close relationship thereto. It is almost certain that the carinati-tabulate periphery is polyphyletic.

Subfalciradiate.

XLVII. Genus—DISSOROCERAS,¹ *S. Buckman*.

(Type: *Dissoroceras tabulatum*, *S. Buckman*.)

1902. DISSOROCERAS, *Emend. Amm. Nom.*, p. 3.

Definition.—Platysubleptogyral, subangustumbilicate (subdensiseptate, sublongi-angustilobate)²; laterally anguli- to flexi-radiate; peripherally sublatanguliradiate, tabulate, subalticarinata. (Radial line, Fig. 76, p. clxv.)

1. DISSOROCERAS TABULATUM, *S. Buckman*. Plate XXI, figs. 5, 6; Suppl., Fig. 76, p. clxv.

1889. LUDWIGIA LUCYI, *This Monogr.*, Pl. xxi, figs. 5, 6 only.

1902. DISSOROCERAS TABULATUM, *Emend. Amm. Nom.*, p. 5.

Description.—Subcrassi-subobscuricostate to levigate with age; subgradumbilicate.

Remarks.—Smoothness appears with some rapidity, so that in a specimen 111 mm. in diameter the costate umbilicus is the only indication of the costate youth.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera, presumably.

2. DISSOROCERAS SUBORNATUM, *S. Buckman*. Suppl., Fig. 77 in text.

Description.—Gradumbilicate, connaticostate, declining early to levigate.

Remarks.—Inner whorls show costæ connate near to the inner margin. The costæ decline to become obscure and subdistant. Smoothness of test commences at about 38 mm. diameter.

Distinction.—From *D. tabulatum*, more compressed whorls, a smaller, less costate, umbilicus, earlier commencement of smoothness.

¹ Δισσός, double; ὄρος, border.

² Seen imperfectly on a specimen of *D. tabulatum*.

Localities and Strata.—Dorset: Stoke Knap in the Building Stone; Bradford Abbas, Fossil Bed, presumably upper part; one specimen 126 mm. in diameter,

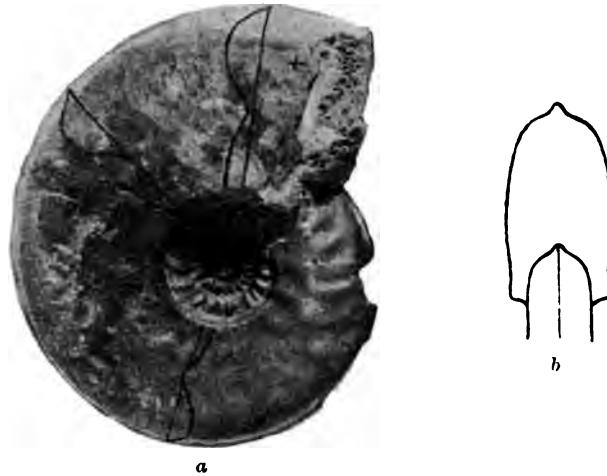


FIG. 77.—*Dissoroceras subornatum*. Stoke Knap.

showing decline of carina and lengthening of peripheral bend of radial line—collected by Mr. D. Stephens; another specimen in Mr. Monk's collection.

Date of Existence.—*Discitæ* hemera, presumably.

3. DISSOROCERAS EXCAVATUM, *S. Buckman*. Suppl., Fig. 78 in text.

1889. *HYPERLIO CERAS DISCITES*, *e* (pars), This Monogr., p. 95.



FIG. 78.—*Dissoroceras excavatum*. Bradford Abbas.

Description.—Subconcaumbilicate; obscuricostate to levigate.

Distinction.—The smaller, less costate, subconcaumbilicus; the more compressed whorls, the narrower periphery.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, presumably upper part.

Date of Existence.—*Discitæ* hemera, presumably.

Deltiradiate.

XLVIII. Genus—DELTOIDOCERAS,¹ *S. Buckman*.

(Type: *Deltoidoceras astrictum*, sp. n.)

1902. DELTOIDOCERAS, Emend. Amm. Nom., p. 3.

Definition.—Platysubleptogyral,² angustumbilicate; sublongi-subangustilobate; laterally subflexiradiate; peripherally subacutanguliradiate, subtabulate, subalticarinata. (Radial line, fig. 79, p. clxv.)

Distinction.—From *Depaoceras*, radial line; relatively smaller umbilication; more definite tabulation and carination of periphery.

Remarks.—The similarity of this genus to *Depaoceras* is suggestive of a common descent from a not very remote ancestor, one akin to *Lucya caduceifera*. But in this genus the carination and tabulation of the periphery, and the rostration have been carried to a further degree of development.

1. DELTOIDOCERAS IDONEUM, *S. Buckman*. Suppl., Fig. 80 in text.

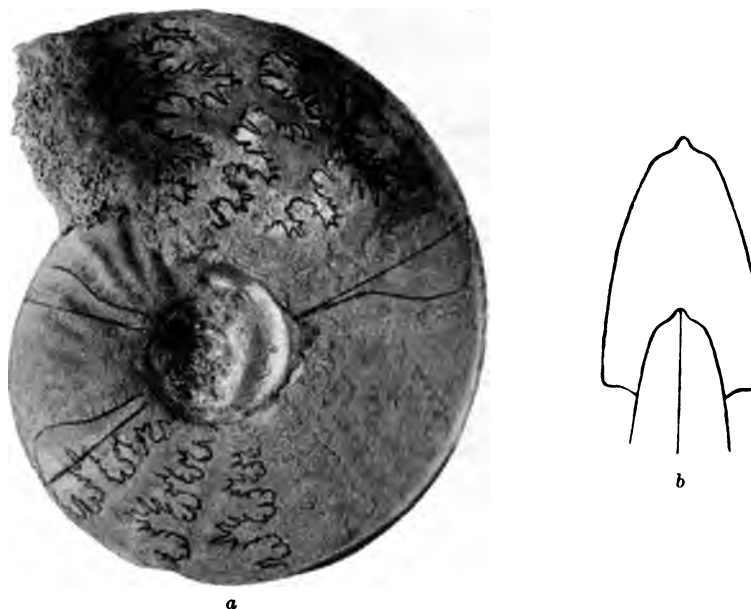


FIG. 80.—*Deltoidoceras idoneum*.

¹ Δελτοειδής, delta-shaped. The cross section is deltoid in shape, and the radial line makes with the guide line a somewhat deltoid figure.

² Medianly subleptogyral, but whorl triangulate.

Description.—Subgradumbilicate, costate.

Locality and Stratum.—The locality of an unlabelled specimen is presumably Somerset : Stoford, from well-grained ironshot—my father's collection. Another specimen, showing costate umbilicus, Bradford Abbas, Dorset, Collection Damon.

Date of Existence.—*Discitæ* hemera, presumably.

2. DELTOIDOCERAS ASTRICUM, *S. Buckman*. Suppl., Fig. 81 in text.

Description.—Subconcavumbilicate, costate.

Distinction.—From *D. idoneum*, the narrower periphery ; the more compressed whorls ; the smaller umbilicus.

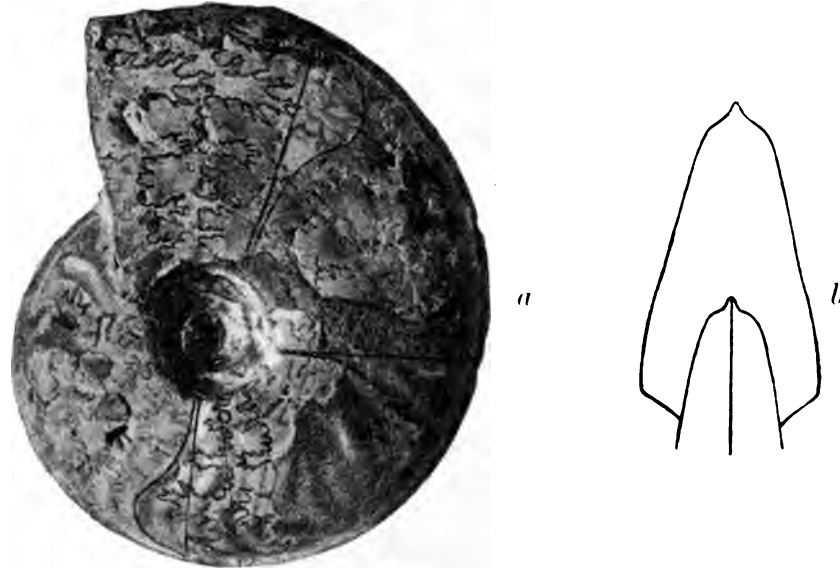


FIG. 81.—*Deltoidoceras astricum*.

Locality and Stratum.—Dorset : Bradford Abbas, in a bluish matrix, from the Fossil Bed.

Date of Existence.—*Discitæ* hemera.

3. DELTOIDOCERAS SUBDISCOIDEUM, *S. Buckman*. Plate XIX, figs. 5, 6 (type) ; Plate XX, figs. 1, 2. Suppl., Fig. 82, p. clxv.

1889. HYPERLIOCERAS SUBDISCOIDEUM, This Monogr., Pl. xix, figs. 5, 6 ; Pl. xx figs. 1, 2.

1902. DELTOIDOCERAS SUBDISCOIDEUM, Emend. Amm. Nom., p. 3.

Description.—Subgradumbilicate ; obscuri-subcrassicostate to levigate.

Note.—The inner whorls of the umbilicus show coarse costæ.

Distinction.—From *Deltoid. astrictum*, earlier failure of costæ, slightly more compressed whorls, with less deltoid cross section.

Remarks.—In the two figured examples the suture lines, obscurely seen, appear to be sublongi-subangustilobate. The radial line on the smaller specimen agrees with this genus; in the larger one it cannot be satisfactorily followed. The cross section in the larger example agrees with that of the genus—gradual decline of the deltoid figure by compression around umbilicus would be expected. That the two examples are specifically identical might be questioned.

Date of Existence.—*Discitæ* hemera, presumably.

Alticarinate.

The carina is a very marked feature.

XLIX. Genus—DELTOTOCERAS,¹ S. Buckman.

(Type: *Deltotoceras cuneatum*, sp. n.)

1902. DELTOCERAS, Emend. Amm. Nom., p. 3.

Definition.—Platygyral, in cross section deltoid; angustumbilicate; subdensi-septate, longi-subangustilobate; laterally perflexiradiate, peripherally acutanguliradiate, tabulate, alticarinate (septicarinate). (Radial line fig. 83, p. clxv.)

Remarks.—Technical terms fail in the definition, the thickness of the whorls being so different on inner and outer areas. They are convergent-sided, with a deltoid figure. In the genotype the carina is distinctly septate; but as I have not observed this character in other species of this or of allied genera, it may be doubted if it be a character of generic distinction.

The species of this genus are clearly allied to *Deltoidoceras*, but rostration has been carried further, and the whorl thickness is greater.

Distinction.—From *Deltoidoceras*, stouter whorls with more pronounced deltoid section, a larger and more developed carina, radial line with more peripheral projection.

Note.—The name first proposed was occupied.

Crassicarinate.

1. *Septicarinate.*

1. DELTOTOCERAS CUNEATUM, S. Buckman. Suppl., Plate XVI, figs. 7—9.

Remarks.—The inner whorls of the figured specimen give evidence of somewhat coarse costæ—an ornament similar to, but perhaps more pronounced

¹ Δελτωτός, delta-shaped, as the cross section is.

than that of *Deltoiloceras idoneum*. More of the inner whorls is exposed than in that species, and the inner marginal edges are much more pronounced.

Locality and Stratum.—Dorset : Bradford Abbas, Fossil Bed, evidently upper part. This fine example of a most distinctive species is unique. It is from the collection formed by Mr. Darell Stephens, F.G.S.

Date of Existence.—*Discitæ* hemera.

2. *Nonsepticarinate*.

2. *DELTOTOCERAS TRIANGULARE*, *S. Buckman*. Suppl., Fig. 84 in text.

Distinction.—From *D. discoideum* (Quenstedt), the stouter, more definitely triangular whorls. From *D. cuneatum*, the smaller umbilicus.

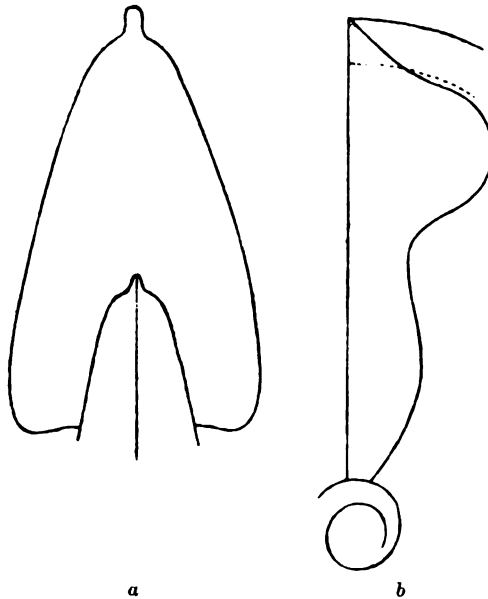


FIG. 84.—*Deltotoceras triangulare*; a, Section; b, Radial line and umbilicus.

Locality and Stratum.—Dorset : Bradford Abbas, Fossil Bed, evidently upper part (Collection of Mr. D. Stephens).

Date of Existence.—*Discitæ* hemera.

3. *DELTOTOCERAS* aff. *DISCOIDEUM* (*Quenstedt*).

1889. *HYPERLIO CERAS DISCOIDEUM*, This Monogr., pp. 98—100. Some of the remarks on p. 99 about the carina refer to this form.

Remarks.—The figures of *H. deflexum* (olim *H. discoideum*, p. 98) Plate XIX,

figs. 1, 2, will indicate this form; but it is not compressed around the umbilicus. It has a much heavier carina. Quenstedt's *A. discoideus* is without test; but the cast seems to indicate a heavy keel. The inner margin of this form does not agree with Quenstedt's figure (see Fig. 85); it is more like that of *D. subsectum*.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed (my father's Collection).

Date of Existence.—*Discitæ* hemera, presumably.

Subcrassicarinate.

The carina not so coarse as in the preceding species.

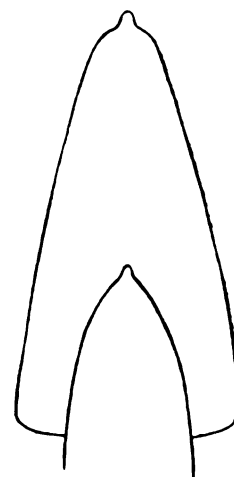


FIG. 85.—*A. discoideus*, Quenst., tracing of type.

4. DELTOTOCERAS SUBSECTUM (*S. Buckman*), Plate XIX, figs. 3, 4; Suppl., Fig. 86, p. clxv.

1889. HYPERLIO CERAS DISCOIDEUM *a*, This Monogr., Pl. xix, figs. 3, 4, only.

1902. DELTOTOCERAS SUBSECTUM, Emend. Amm. Nom., p. 3.

Description.—Subgradumbilicate (inner margins of whorls overhanging umbilicus); levigate; whorl-section acutely triangular; densiseptate, sublongisubangustilobate.

Note.—Suture line differs slightly from that of preceding series.

Remarks.—For distinction from the last species and from *A. discoideus*, see p. 99.

Localities and Strata.—Bradford Abbas, Fossil Bed, evidently upper part; Gloucestershire: Wistley Hill, near Cheltenham (Lower *Trigonia*-Grit; 'Quart. Journ. Geol. Soc.,' vol. li, p. 414, sect. xix, Bed 2).

L. Genus—HYPERLIO CERAS, *S. Buckman*.

(Type: *Hyperlioceras discites*, Waagen, sp.)

1889. HYPERLIO CERAS, This Monogr., p. 88.

Definition.—Perplatyleptogyral; angustumbilicate; subpauciseptate, breviusubangustilobate; laterally flexiradiate; peripherally acutanguliradiate, penetabulate, alticarinate. (Radial line fig. 87, p. clxv.)

Notes.—The ribs are subfalcate, with a long peripheral projection. The gradumbilicus shown by Waagen is incorrect, it is filled with matrix in the original.

Remarks.—The above definition and notes are drawn up partly from Waagen's figure, partly from several photographs and a drawing kindly sent me by Dr. Paul Gustaf Krause, to whom I beg to tender my very best thanks for the considerable trouble he took in this matter.



FIG. 88.—*Hyperlioceras discites* (Waagen).
From a photograph of the holotype in
the Berlin Museum.

I cannot identify any English specimens satisfactorily with *Am. discites*. Those which agree in costation differ in proportions; those which agree in proportions differ in costation; and most species seem to be more longilobate.

As this is an important species, and the type of the genus, a reproduction of one of Dr. Krause's photographs of the type is advisable. It is given in the accompanying fig. 88. The species more or less closely allied to *Hyperlioceras discites* are given in the following pages.

A. Subtriangularia.

1. *HYPERLIO CERAS DEFLEXUM*, *S. Buckman*. Plate XIX, figs. 1, 2.

1889. *HYPERLIO CERAS DISCOIDEUM*, β , This Monogr., Pl. xix, figs. 1, 2 only;
pp. 98—100 (pars).

Description.—To 50 mm. diameter costate; to 70 mm. diameter subcostate; then smooth; whorl-section subtriangular, becoming flattened.

Distinction.—Young like *H. discites*, but they differ in whorl-section. From *A. discoideus*, see p. 99.

Note.—Not *Deltoidoceras*, nor *Deltotoceras*, because the suture line is brevilatilobate.

Date of Existence.—*Discitæ* hemera, presumably.

2. *HYPERLIO CERAS DESORI* (*Moesch*). Plate XVII, figs. 6, 7; Suppl., Figs. 89, 90, p. clxv.

1889. *HYPERLIO CERAS DESORI*, This Monogr., Pl. xvii, figs. 6, 7; p. 97.

Remarks.—Moesch gives the dimensions of his specimen as—diameter 124 mm.,

width of umbilicus 14 mm. But his figure shows along the diameter-line of 124 mm. an umbilicus only 10 mm. across. Where the umbilicus is 14 mm. across the specimen, had it not been broken, would have been about 150 mm. in diameter.



FIG. 89.—Suture line of *Hyperlioceras Desori* (from my specimen).

B. Parallela.

The whorl-section with somewhat parallel sides separates this series from the last.

1. *Pingvia*.

The whorls are somewhat stout.

3. *HYPERLIO CERAS LUCYI*, *S. Buckman*. Plate XXI, figs. 3, 4; Suppl., Figs. 91, 92, p. clxv.

1889. *LUDWIGIA LUCYI*, This Monogr., Pl. xxi, figs. 3, 4 only.

Remarks.—The costæ are coarse and distant, but not prominent. They join by twos a little distance from inner margin to form subobscure lumps. The radial line with long peripheral projection indicates the generic position.



FIG. 91.—Suture line of *Hyperlioceras Lucyi*.

4. *HYPERLIO CERAS SUBLEVE*, *S. Buckman*. Plate XVII, fig. 5; Plate XVIII, fig. 3; Suppl., Fig. 93, p. clxv.

1889. *HYPERLIO CERAS DISCITES*, This Monogr., Pl. xvii, fig. 5; Pl. xviii, fig. 3 only.

1902. — *SUBLEVE*, Emend. Amm. Nom., p. 4.

Description.—Concavumbilicate; levigate.

Distinction.—From *Am. discites*, stouter whorls, larger umbilicus, and the absence of costæ.

2. *Compressa*.

The whorls are thinner than in the preceding series.

5. *HYPERLIO CERAS CURVICOSTATUM*, *S. Buckman*. Suppl., Plate XVI, figs. 4—6.

Description.—Costate (declining); subgradumbilicate; subdensiseptate; brevisubangustilobate.

Distinction.—From *H. discites*, the larger umbilicus.

Remarks.—The figured example is mostly without test, hence the small size of the carina, which has, however, been drawn not quite prominent enough. Still, the carina is not so developed as in similar species.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably.

6. *HYPERLIO CERAS RUDIDISCITES*, *S. Buckman*. Plate XVIII, figs. 1, 2 (Type);
Plate XVII, figs. 3, 4; Suppl.,
Fig. 94, p. clxv.

1886. *AMMONITES DISCOIDEUS*, *Quenstedt*, *Amm. Schwäb. Jura*, Pl. lviii, fig. 4 only.

1889. *HYPERLIO CERAS DISCITES*, *This Monogr.*, Pl. xviii, figs. 1, 2; Pl. xvii, figs. 3, 4, p. 94.

1902. — *RUDIDISCITES*, *Emend. Amm. Nom.*, p. 4.

3 *Remarks*.—A necessary change of name. Fully described on p. 94.

Distinction.—From *H. discites*, the larger umbilicus (see p. 95) and the less distinct costæ.

7. *HYPERLIO CERAS DISCITIFORME*, *S. Buckman*. Plate XVI, figs. 12, 13; Suppl., Plate XVIII, figs. 7—9, 23.

1889. *HYPERLIO CERAS DISCITES*, *This Monogr.*, Pl. xvi, figs. 12, 13 only.

1902. — *DISCITIFORME*, *Emend. Amm. Nom.*, p. 4.

Description.—Subconcaumbilicate; spissi-parvicostate, declining to striate.

Distinction.—From *H. rudidiscites*, thinner, more compressed around umbilicus, which is also rather more exposed. From *H. discites*, less prominent costæ, more closely set.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, evidently upper part; Burton Bradstock, from a grey matrix (Collection of Mr. D. Stephens).

Date of Existence.—*Discitæ* hemera.

8. *HYPERLIO CERAS LIODISCITES*, *S. Buckman*. Plate XVII, figs. 1, 2; Suppl., Figs. 95, 96, p. clxv.

1889. *HYPERLIO CERAS DISCITES* α, This Monogr., Pl. xvii, figs. 1, 2 only.

1902. — *LIODISCITES*, Emend. Amm. Nom., p. 4.

Description.—Subconca vumbilicate; levigate.

Remarks.—This is a thin form with narrow periphery and prominent carina. Ribs, if present, would only belong to quite the young stage. As regards the inner margin, the upper edge tends to overhang the umbilicus.

Distinction.—From *H. discitifor me*, smoothness, greater compression, smaller umbilicus. From *H. discites*, the smooth test. There is general likeness also to *Toxolioceras tenerum* (see below, p. cxxvii), but radial line and suture line are distinctions; also the narrower, more carinate periphery, and the deeper, more concentric umbilicus.



FIG. 95.—Suture-line of *Hyperlioc. liodiscites* (from type).

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed, evidently upper part. Somerset: Dundry, middle of "Limestone and Marl Beds" ('Quart. Journ. Geol. Soc.,' vol. lii, p. 677, Bed 13).

Date of Existence.—*Discitæ* hemera.

In the next species the radial line lacks the long peripheral projection characteristic of the previous forms.

9. *HYPERLIO CERAS ? OCCLUSUM*, *S. Buckman*. Suppl., Plate XXI, figs. 34—36.

Description.—Perplatyleptogyral; concavumbilicate; spissiparvicostate to striate; periphery tabulate; alticarinata.

Distinction.—From *H. Desori*, finer style of costation; broader periphery, with less projected radial line.

Remarks.—It does not seem to be actually related to *H. Desori*, though it has somewhat the appearance of that species. There is nothing else to compare with it.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

Biarcuate, much projected peripherally.

LI. *Genus*—TOXOLIOCERAS,¹ *S. Buckman*.

(Type: *Toxolioceras Walkeri*, *S. Buckman*.)

1902. TOXOLIOCERAS, *Emend. Amm. Nom.*, p. 5.

Definition.—Platyleptogyral, angustumbilicate; densiseptate, brevisublatilobate²; laterally anguliradiate, peripherally acutanguliradiate, tabulate, crassialticarinate. (Radial line, Fig. 97, p. clxv.)

Distinction.—From *Darellia*, radial line more projected peripherally, stronger carina, character of costate ornament. From *Hyperlioceras*, radial line more definitely biarcuate, larger umbilication, earlier smoothness.

Remarks.—The alti-carinati-tabulate periphery is shown to perfection in adult *T. Walkeri*.

1. TOXOLIOCERAS INCISUM, *S. Buckman*. Suppl., Plate XXI, figs. 31—33.

Description.—Subangustumbilicate, costate.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Burton Bradstock, grey matrix.

Date of Existence.—*Discitæ* hemera, presumably.

2. TOXOLIOCERAS MUNDUM, (*S. Buckman*). Suppl., Plate XVIII, figs. 4—6.

Description.—Parvispissicostate and subangustumbilicate (gradumbilicate).

Distinction.—From *T. incisum*, smaller umbilicus, neater ornament.

Locality and Stratum.—Dorset: Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

3. TOXOLIOCERAS WALKERI (*S. Buckman*). Plate XVI, figs. 1, 2; Suppl., Plate XVIII, figs. 1—3, 22.

1889. HYPERLIOCERAS WALKERI, *This Monogr.*, Pl. xvi, figs. 1, 2, only (not figs. 4—11).³

1902. TOXOLIOCERAS WALKERI, *Emend. Amm. Nom.*, p. 5.

Distinction.—From *T. mundum*, smaller umbilicus before excentricity commences. In the adult the umbilicus reverts from angust to become subangust.

¹ Τοξον, a bow, in reference to the radial line.

² In adult *T. Walkeri*, affected perhaps by gerontic catagenesis.

³ Figs. 3—6, *Darellia polita*; figs. 7, 8, 9, *Reynesella piodes*; figs. 10, 11, *Reynesia cœla*.

Remarks.—For comparison with the species of the genus and with species of *Darellia*, *Hyperlioceras*, etc., formerly confounded herewith, an immature example has been depicted in Suppl., Plate XVIII, figs. 1—3.

Locality and Stratum.—Dorset : Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

4. *TOXOLIOCERAS TENERUM*, *S. Buckman*. Suppl. Fig. 98 in text.

Description.—Levigate, angustumbilicate (subconcaumbilicate).

Distinction.—From *T. Walkeri*, the smaller umbilicus.

Remarks.—In *T. Walkeri* excentric coiling commences at a radius of 67 mm.; in this species it begins at a radius of 31 mm. In *T. Walkeri* this excentric

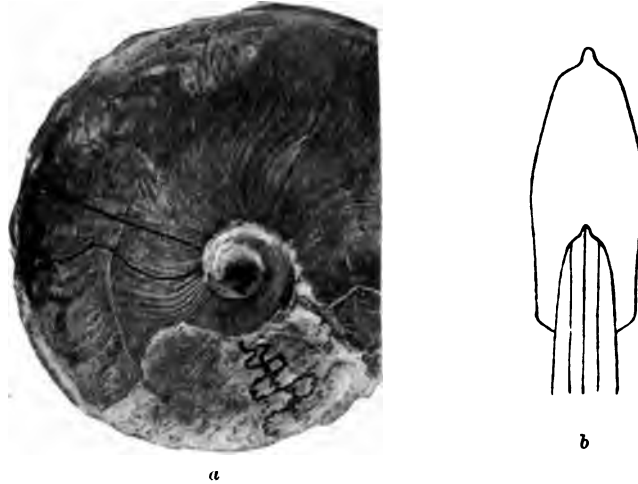


FIG. 98.—*Toxolioceras tenerum*.

coiling follows after a gradumbilicate stage, in this species after a subconcaumbilicate stage.

Locality and Stratum.—[Dorset : Bradford Abbas, Fossil Bed], certainly by matrix, though figured specimen not labelled.

Date of Existence.—*Discitæ* hemera.

Falcate, subprojected peripherally.

LII. Genus—STOKEIA,¹ *S. Buckman*.

(Type : *Stokeia marmorea*, sp. n.)

Definition.—Perplatyleptogyral, angustumbilicate; laterally flexiradiate; peripherally subacutanguliradiate, penetabulate, alticarinate. (Radial line, fig. 99, p. clxv.)

¹ Stoke Knap, near Broad Windsor.

Distinction.—From *Darellia*, the radial line, which is falcate instead of biarcuate, the stronger carina, the smaller umbilication. From *Toxolioceras*, the radial line, the smaller umbilicus, the slightly convergent, not parallel-sided, build of whorls.

1. *STOKEIA MARMOREA*, *S. Buckman*. Suppl., Plate XXII, figs. 13—15; Fig. 99, p. clxv.

Description.—Subdistanti-subobscurocostate to levigate; gradumbilicate.

Remarks.—The ribs are connate, inconspicuous, and rather distant. There is a gradual decline to striæ at about 50 mm. diameter; but the ribs are very feeble before that.

Locality and Stratum.—Dorset: Stoke Knap, Building Stone.

Date of Existence.—*Discitæ* hemera, presumably.

2. *STOKEIA SUBACUTA*, *S. Buckman*. Suppl., Pl. XVIII, figs. 10—12.

Description.—Obsoleticostate to levigate; concavumbilicate.

Remarks.—The overlap of whorl is to the edge of preceding inner margin. There are faint indications of distant costæ; but practically the costæ have failed when the diameter of about 25 mm. is reached.

Distinction.—From *S. marmorea*, failure of costæ, the concavumbilicus, the narrower periphery.

Localities and Strata.—Dorset: Bradford Abbas neighbourhood, probably Halfway House from the "Blue Beds"; but the exact locality is not recorded. Somerset: Dundry, Limestone and Marl beds.

Date of Existence.—*Discitæ* hemera, presumably.

End of *Carinatitabulate* series.

A Lioceratoid genus.¹

LIII. Genus.—*CANAVARELLA*, *S. Buckman*.

(Type: *Canavarella belophora*, sp. n.)

Definition.—Platysubleptogyral, sublatumbilicate; subdensiseptate; subbrevisubangustilobate; laterally flexiradiate; peripherally acutanguliradiate, acutifastigate, parvicarinate. (Radial line, fig. 100. p. clxv.)

Distinction.—From *Lioceras*, the whorls thinner and more acute peripherally; the radial line more projected peripherally and altogether more definitely falciform.

¹ See p. xxxiii.

1. CANAVARELLA BELOPHORA. *S. Buckman.* Suppl., Plate XXII, figs. 22—24.

Description.—Subpaucicostate, with little sign of decline.

Locality and Stratum.—Dorset: Stoke Knap, in sandy grits with *Terebratula infraoolithica*.

Date of Existence.—*Scissi hemera*.

The two following species have a radial line much less projected peripherally than in *C. belophora*. It is like that of *Lioceras*; but they are much more compressed shells than any of that genus, also they do not show any striate character.

2. CANAVARELLA ? TOMA, *S. Buckman.* Suppl. Plate XXII, figs. 16—18.

Description.—Leptogyral; angustumbilicate; subspissi-parvi- and connaticostate; periphery acutifastigate.

Locality and Stratum.—Gloucestershire: Buckholt Wood (Frocester), hard bed at top of Cephalopod bed.

Date of Existence.—*Opaliniformis hemera*.

3. CANAVARELLA ? SCELETA, *S. Buckman.* Suppl., Plate XXII, figs. 19—21.

Description.—Almost perleptogyral; angustumbilicate; subpauci-subobscursisimplicicostate, periphery acutifastigate.

Distinction.—From *C. toma*—the umbilicus is a little wider, and the margin less definite, the ribs are not connate, are somewhat distant, and are less distinct.

Locality and Stratum.—Dorset: Burton Bradstock, top of Yeovil Sands.

Date of Existence.—*Aalensis*, or *Opaliniformis hemera*.

The following species is placed here for convenience only.

4. CANAVARELLA ? ARENACEA, *S. Buckman.* Plate XXVIII, figs. 20, 21; Suppl., Fig. 101, p. clxv.

1890. GRAMMOCERAS STRIATULUM, *This Monogr.*, Pl. xxviii, figs. 20, 21.

Description.—Platyleptogyral, sublatumbilicate; pauciseptate, brevilatilobate; subspissi-parvicostate; periphery subfastigate, parvicarinate.

Distinction.—From *Ammonites lympharum*, Dumortier,¹ the smaller carina, the much more open umbilicus.

Remarks.—This species is not a *Grammoceras*, nor does it belong to any of the *Grammoceratoid* genera. The radial line is remarkable with its biarcuate curves. The species may be allied to *Am. lympharum*, Dum.; but it is easily separable therefrom.

¹ 'Dep. Jurass. Rhône,' iv, Pl. xvi, figs. 5, 6.

Localities and Strata.—Gloucestershire: near Stroud, Buckholt Wood; near Dursley, Coaley Wood; nodules in the *striatulus* beds.

Date of Existence.—*Variabilis* hemera, properly—the nodules being *remanié* in the *Striatulus* beds.

CYPHOLIOCERAS PLICATUM? Plate XIV, figs. 5, 6. (See p. xlv.)

1888. LIOCERAS OPALINUM, *var. COMPTUM*, This Monogr., Pl. xiv, figs. 5, 6.

The radial line (fig. 102, p. clxv) of this specimen, however, is less curved laterally and less projected peripherally than in the type, perhaps due to youth.

HYATTINA? sp. Pl. IV, fig. 7; Suppl., Pl. XVII, fig. 29. (See p. lvii.)

1887. LIOCERAS BRADFORDENSE, This Monogr., Pl. iv, fig. 7.

Description.—The periphery is subtabulate, the carina is subdistinct, subacute. Suture-lines: Subdensiseptate, sublongi-angustilobate.

Note.—The radial line (Suppl., Pl. XVII, fig. 29) is drawn with rather too much lateral curve: the bend should not be quite so close to the guide line.

Remarks.—Nearest to *Hyattina Brasili*, agrees fairly in suture line—perhaps a trifle more longilobate—in periphery—in carina, *H. Brasili* having no test, in proportions; differs in ornament, the ribs being closer together, and not so coarse.

BRASILINA TUTCHERI? Suppl., Pl. X, figs. 35—37. (See p. lxxxiii.)

Remarks.—The specimen referred to looks like a young example of *B. Tutcheri*, but it seems to be too compressed and too carinate.

GAMMIRADIATE.

Quite a distinct series of Ammonites of the family *Hildoceratidæ* has now to be dealt with; they were formerly classed as *Grammoceras*. Their radial line in the main suggests a Greek Γ; and the suture line is simple. Other characters are well-marked ribs and latumbilication; but normal decline affects these features to produce small ribs, or none at all, and angustumbilication. Before degeneration sets in the species have much likeness to *Lillia* (p. xiii), but with this important distinction: the earliest species (see below, *Grammoceras*) have costæ with knobs on the peripheral edge; in *Lillia* the knobs are on the umbilical border. However, in an allied genus, *Chartronia* (p. xvi), there are two rows of nodi. Possibly, then, *Lillia*, *Chartronia*, *Grammoceras*, with their respective allies and descendants, have a common origin in a binodate ancestor.

The distinction of *Grammoceras* and its allies as a sub-family from *Lillia*, *Ludvigia*, etc., would seem advisable. The difficulty, however, is with definition; because the degenerates in both series, passing through similar phases of decline, simulate each other's characters so much, and lose the features once severally distinctive; therefore broad demarcation seems to be difficult.

A. Non-septicarinate.

LIV. Genus—GRAMMOCERAS, Hyatt.

(Type: *Grammoceras striatulum*, J. D. C. Sow., sp.)

1890. GRAMMOCERAS, This Monogr., p. 158 (pars).

1900. DUMORTIERIA,¹ Hyatt, in Text-book of Palæontology, by Zittel-Eastman, vol. i, p. 576.

Definition.—Substenoleptogyral, latumbilicate; pauciseptate; subbrevisublatilobate; laterally subflexiradiate; peripherally subacutanguliradiate, fastigate, parvi-nonsepticarinate. (Radial line, fig. 103, p. clxv.)

Note.—The definition applies to the genotype which is already degenerate. Such characters as the fastigate periphery and leptogyral shape mark degeneration: a subtabulate periphery, and subleptogyral, even subpachygyral, whorls are characters of less degenerate species of the genus.

Remarks.—The species figured by Wright, 'Monogr. Lias Amm.,' Plate xlix, figs. 4, 5, as *Harpoceras nitescens* has, according to a specimen kindly given to me by Dr. Vaughan, the simple suture line,² rib characters and general shape of *Grammoceras toarciense*, with this difference: it is knobbed on the peripheral margin.

As my specimen is certainly a *Grammoceras*, it takes the genus a step further back into the tuberculate stage, with the important distinction from *Lillia* that the tubercles occupy the outer, not the inner, edge of the whorl.

A carina between two definite furrows is also a character of my specimen, though the furrows become obsolete with age. Wright shows the furrows more persistent.

Separation of the species formerly (p. 158 *et seqq.*) placed under *Grammoceras* has become necessary.

1. GRAMMOCERAS, sp. A., Plate XXXIV, fig. 12.

1890. GRAMMOCERAS TOARCENSE, var., This Monogr., Pl. xxxiv, fig. 12; p. 169.

Remarks.—A distinct form with a wide umbilicus, a carinati-subtabulate periphery and occasional connate costæ.

¹ The Fig. 1201 labelled "*Dumortieria*, sp.," is *Grammoceras toarciense*. It has neither the ribbing nor the suture line of *Dumortieria*.

² The lobe line given by Wright, fig. 3, seems doubtful. At least, my specimen has quite the simple suture line of *Grammoceras*.

2. GRAMMOCERAS AUDAX, *S. Buckman*. Plate XXVIII, figs. 4—6; Suppl., Fig. 104, p. clxv.

1890. GRAMMOCERAS TOARCENSE, This Monogr., Pl. xxviii, figs. 4—6; p. 169.

1902. — AUDAX, Emend. Amm. Nom., p. 3.

Description.—Crassipaucicostate, with nearly quadrate whorls, periphery subtabulate.

Distinction.—From *G. toarciense*, the stouter whorls, broader periphery, coarser costation.

3. GRAMMOCERAS TOARCIENSE (*d'Orbigny*). Plate XXVIII, figs. 7—13.

1843. AMMONITES THOUARSENSIS, *d'Orbigny*, Ceph. Jurass., Pl. lvii.

1878. GRAMMOCERAS THOUARSENSE, *Bayle*, Pl. lxxviii, fig. 3 only.

1885. AMMONITES EADIANUS DEPRESSUS, *Quenstedt*, Amm. Schwäb Jura, Pl. lii, fig. 1.

1890. GRAMMOCERAS TOARCENSE, This Monogr., Pl. xxviii, figs. 7—13; pp. 169—173 (pars).

1902. — — *Janensch*, Abh. Geol. Spez-Karte Elsass-Lothr., N. F., Heft v, Pl. iii, fig. 2.

Distinction.—A less robust form than *G. audax*, with smaller, more numerous, costæ, and a narrow though flattish periphery.

Remarks.—Beyond the diameter of the specimen depicted in Plate XXVIII, figs. 7, 8, the periphery becomes more and more fastigate, though the ribs tend to gain more of the distant character of those in *G. audax*.

The largest specimens which I have obtained are, from Coaley Wood, 140 mm. in diameter, from Wotton-under-Edge, 127 mm. in diameter.

4. GRAMMOCERAS PENESTRIATULUM, *S. Buckman*. Plate XXVIII, figs. 16, 17.

1890. GRAMMOCERAS STRIATULUM, This Monogr., Pl. xxviii, figs. 16, 17; p. 173.

1902. — PENESTRIATULUM, Emend. Amm. Nom., p. 3.

Description.—Subparvicostate, periphery fastigate.

Distinction.—From *G. striatulum*, coarser, less numerous costæ.

GRAMMOCERAS STRIATULUM, *J. D. C. Sowerby*. Plate XXVI, figs. 8—10;
Plate XXVIII, figs. 18, 19.

1890. GRAMMOCERAS STRIATULUM, This Monogr., Pl. xxvi, figs. 8—10; Pl. xxviii, figs. 18, 19; p. 173.

In Pl. A., figs. 43—45 show radial and suture lines of *Grammoceras*, though not necessarily of *G. striatulum*.

LV. Genus—COTTESWOLDIA,¹ *S. Buckman*.(Type: *Cotteswoldia paucicostata*, sp. n.)

1902. COTTESWOLDIA, Emend. Amm. Nom., p. 3.

Definition.—Subplatyleptogyral, sublatumbilicate; subpauciseptate, brevilatilobate; laterally subrectiradiate; peripherally anguliradiate, fastigate, paricarinate. (Radial line, fig. 105, p. clxv.)

Distinction.—From *Grammoceras*, a more distant style of costation, broader and more compressed whorls; and in the main less peripherally projected radii. Deficiency of carination in the costate species.

Remarks.—Besides the typical series (I) it seems advisable to place here for the present two other series. Their distinctions may be noted in the following manner:

- I. Costæ simple.
- II. Costæ connate.
- III. Costæ connate, but umbilicus persists larger.

I. Costæ simple.

1. COTTESWOLDIA PAUCICOSTATA, *S. Buckman*. Suppl., Plate XXIII, figs. 1—3.

Description.—Distanti-subcrassicostate to obsoleticostate.

Localities and Stratum.—Gloucestershire, Buckholt Wood (Frocester); Bowcott Wood (Dursley); Upper part of Cephalopod Bed (*Moorei* Beds).

Date of Existence.—*Moorei* hemera.

2. COTTESWOLDIA COSTULATA (*Zieten*). Plate XXXIII, figs. 3, 4; Suppl., Plate XXIII, figs. 4, 4a.

cf. 1885. AMMONITES COSTULA, *Quenstedt*, Amm. Schwäb Jura, Pl. liv, figs. 7, 51.

1890. GRAMMOCERAS COSTULATUM, This Monogr., Pl. xxxiii, figs. 3, 4; p. 179.

1902. COTTESWOLDIA COSTULATA, Emend. Amm. Nom., p. 3.

Distinction.—From *C. paucicostata*, the ribs are not so coarse and the umbilicus is not so concentric—it is more oligogyral.

Localities and Stratum.—Gloucestershire: Coaley Peak, Frocester Hill, Haresfield Hill, Cephalopod Bed, upper part.

Date of Existence.—*Aalensis* hemera.

3. COTTESWOLDIA PARTICOSTATA, *S. Buckman*. Suppl., Plate XXIII, figs. 5—7.

Description.—Subspissicostate, passing to obsoleticostate and levigate.

Distinction.—From *C. costulata*, a larger number of more closely set costæ.

Locality and Stratum.—Gloucestershire: Buckholt Wood (Frocester), Cephalopod Bed, upper part (*Moorei* Beds).

Date of Existence.—*Moorei* hemera.

¹ Cotteswold Hills.

4. COTTESWOLDIA EGENA, *S. Buckman*. Suppl., Plate XXIII, figs. 9—11.

cf. 1885. AMMONITES COSTULA, *Quenstedt*, Amm. Schwäb. Jura, Pl. liv, fig. 14.

Description.—Subdistanti-parvicostate, passing to obsoleticostate and striate.

Distinction.—From *C. costulata*, smaller ribs while costate, and early decline to a distinct striate stage.

Locality and Stratum.—Gloucestershire: Buckholt Wood (Frocester), Cephalopod Bed, upper part (*Moorei* Beds).

Date of Existence.—*Moorei* hemera.

5. COTTESWOLDIA LIMATULA, *S. Buckman*. Plate XXX, figs. 5—7; Suppl., Fig. 106, p. clxv.

cf. 1885. AMMONITES cf. RADIANUS DEPRESSUS, *Quenstedt*, Amm. Schwäb. Jura, Pl. liv, fig. 15.

1890. GRAMMOCERAS MACTRA, *This Monogr.*, Pl. xxx, figs. 5—7; p. 176 (pars).

1902. COTTESWOLDIA LIMATULA, *Emend. Amm. Nom.*, p. 3.

Description.—Subspissiparvicostate, declining.

Distinction.—From *C. egena*, costæ are more numerous; the umbilicus has a less definite inner margin.

Localities and Strata.—Gloucestershire: Frocester Hill, Cephalopoda Bed, upper part (*Aalense* Beds). Foreign—France: “Le Bernard (Vendée) Lias supérieur, Le Moulin Drapeau” (submitted by Mr. C. Chartron).

6. COTTESWOLDIA ATTRITA, *S. Buckman*. Suppl., Plate XXIII, figs. 12—14.

cf. 1885. AMMONITES cf. COSTULA, *Quenstedt*, Amm. Schwäb. Jura, Pl. liv, fig. 50.

Description.—Parvicostate, passing to subirregulari-subobscuricostate, and tending to decline to levigate; periphery subfastigate; carina slightly distinct.

Note.—The figure shows the costæ rather too definite and distinct.

Distinction.—Is a stouter shell with a more definite periphery than any of the preceding species.

Locality and Stratum.—Gloucestershire: Buckholt Wood (Frocester), Cephalopod Bed, upper part (*Moorei* Beds).

Date of Existence.—*Moorei* hemera.

II. Costæ Connate.

7. COTTESWOLDIA SUPERBA, *S. Buckman*. Plate XXXII, figs. 1, 2; Suppl., Fig. 107, p. clxv.

cf. 1885. AMMONITES cf. RADIANUS, *Quenstedt*, Amm. Schwäb. Jura, Pl. liv, fig. 21.

1890. GRAMMOCERAS AALENSE, *This Monogr.*, Pl. xxxii, figs. 1, 2; p. 192 (pars).

1902. COTTESWOLDIA SUPERBA, *Emend. Amm. Nom.*, p. 3.

Description.—Costate; the costæ occasionally connate; umbilicus somewhat excentric.

Locality and Stratum.—Gloucestershire: Coaley Peak (Frocester), in top part of Cephalopod Bed.

Date of Existence.—*Aalensis* hemera.

8. COTTESWOLDIA SUBCANDIDA, *S. Buckman*. Plate XXXII, figs. 7, 8; Suppl., Fig. 108, p. clxv.

1890. GRAMMOCERAS AALENSE, This Monogr., Pl. xxxii, figs. 7, 8; p. 192 (pars).

1902. COTTESWOLDIA SUBCANDIDA, Emend. Amm. Nom., p. 3.

Description.—Subcostate, declining to obscuricostate.

Distinction.—From *C. superba*, the ornament.

Locality and Stratum.—Gloucestershire: Coaley Peak (Frocester), top of Cephalopod Bed.

Date of Existence.—*Aalensis* hemera.

9. COTTESWOLDIA MISERA, *S. Buckman*. Plate XXXI, figs. 15, 16; Suppl., Fig. 109, p. clxv.

1890. GRAMMOCERAS AALENSE, This Monogr., Pl. xxxi, figs. 15, 16; p. 192 (pars).

1902. COTTESWOLDIA MISERA, Emend. Amm. Nom., p. 3.

Description.—Parvicostate, with tendency to decline.

Distinction.—The smallness of the ornament.

Locality and Stratum.—Gloucestershire: Haresfield Hill, top of Cephalopod Bed.

Date of Existence.—*Aalensis* hemera.

10. COTTESWOLDIA, sp. Plate XXXI, figs. 13, 14; Suppl., Fig. 110, p. clxv.

1890. GRAMMOCERAS SUBSERRODENS, This Monogr., Pl. xxxi, figs. 13, 14; p. 179 (pars).

Locality and Stratum.—Gloucestershire: Haresfield Hill, Cephalopod Bed, upper part.

Date of Existence.—*Aalensis* hemera.

III. Umbilicate.

There appears to be generally more lateral curvature to the radial line in this series than in the foregoing.

11. *COTTESWOLDIA DISTANS* (*S. Buckman*). Plate XXXIII, figs. 1, 2; Suppl., Plate XXIII, fig. 8.

1890. *GRAMMOCEERAS DISTANS*, This Monogr., Pl. xxxiii, figs. 1, 2; p. 196.

1902. *COTTESWOLDIA DISTANS*, Emend. Amm. Nom., p. 3.

Remarks.—In the figured specimen the ribs are distinctly joined near the inner margin in two or three cases. The duplication of ribs towards peripheral area, shown in the figure, is a mistake of the draughtsman.

Locality and Stratum.—Gloucestershire: Haresfield Hill, Cephalopod bed, upper part.

Date of Existence.—*Aalenensis* hemera.

12. *COTTESWOLDIA BIFAX*, *S. Buckman*. Fig. 110A in text.



FIG. 110A. *Cotteswoldia bifax*; a, side view; b, section.

Description.—Connaticostate, declining to subcostate and striate; periphery fastigate, passing on to become convex; carina subdistinct, but failing where periphery tends to convexity.

Remarks.—Costæ are irregular in size, and tend to join on inner border. The species is remarkable for the two distinct phases—costate and striate—both so marked and well developed; also for the great likeness to *Dumortieria Moorei*. Therefrom, however, the laterally curved radial line with longer peripheral projection distinguishes it.

Locality and Stratum.—Gloucestershire: Buckholt Wood (Frocester), Cephalopod Bed, *Moorei* (*aalenensis*?) beds.

Date of Existence.—*Moorei* (*aalenensis*?) hemera.

13. *COTTESWOLDIA CRINITA*, *S. Buckman*. Plate XXXI, figs. 3, 4; Suppl., Fig. 111, p. clxv.

1890. *GRAMMOCERAS MACTRA* β , This Monogr., Pl. xxxi, figs. 3, 4; p. 176 (pars).

1902. *COTTESWOLDIA CRINITA*, Emend. Amm. Nom., p. 3.

Description.—Striate; periphery tending to be convex with no definite carina.

Distinction.—From *C. bifax*, greater compression, more of striate stage.

Remarks.—The costate stage, similar to that of *C. bifax*, but on a reduced scale, ends about a whorl earlier than in that species. Tachygenesis in this feature, and in regard to the periphery, in comparison with *C. bifax*, seems well marked.

The side view in the monograph is by no means a satisfactory representation.

Locality and Stratum.—Gloucestershire: Coaley Peak (Frocester), Cephalopod Bed, *Moorei* [*Aalensis*?] Beds.

Date of Existence.—*Moorei* (*Aalensis*?) hemera.

LVI. Genus—PLEYDELLIA,¹ *S. Buckman*.

(Type: *Pleydellia aalensis*,² Zieten, sp.)

1899. *PLEYDELLIA*, This Monogr., Expl. of Suppl., Pl. x.

Definition.—Subplatyleptogyral, sublatumbilicate; subpauciseptate; brevisublatilobate; laterally subflexiradiate; peripherally anguliradiate, acutifastigate, carinate. (Radial lines, figs. 112, 113, p. clxv.)

Distinction.—From *Cotteswoldia*, more compressed form of whorls, though hardly enough to be called perleptogyral, more laterally flexed radial line (from the type series), sharper periphery, distinct carina.

Note.—*Ammonites candidus*, d'Orbigny, Pal. franç.; Terr. jurass.; Pl. lxiii, figs. 1, 2, would appear to be a species of this genus.

1. *PLEYDELLIA AALENSIS* (ZIETEN). Plate XXXII, figs. 3—6; Suppl., Figs. 112, 113, p. clxv.

1890. *GRAMMOCERAS AALENSE*, This Monogr., Pl. xxxii, figs. 3—6; p. 192 (pars).

1902. *PLEYDELLIA AALENSIS*, Emend. Amm. Nom., p. 4.

2. *PLEYDELLIA FLUENS*, *S. Buckman*. Plate XXXI, figs. 1, 2; Suppl., Fig. 114, p. clxv.

1890. *GRAMMOCERAS MACTRA*, This Monogr., Pl. xxxi, figs. 1, 2; p. 176 (pars).

1902. *PLEYDELLIA FLUENS*, Emend. Amm. Nom., p. 4.

Description.—Connati-parvicostate to obscuricostate.

¹ In compliment to Mr. J. C. Mansel Pleydell, J.P., F.L.S., F.G.S., etc., for so many years President of the Dorset Field Club.

² The type of the genus is the species figured in this Monograph, Pl. xxxii, figs. 4—6.

Distinction.—From *P. aalensis*, finer ornament.

Date of Existence.—*Aalensis* hemera.

3. PLEYDELLIA LEURA (*S. Buckman*). Plate XXXIII, figs. 8—10 (type); figs. 5—7; Suppl., Figs. 115, 116, pp. clxv, clxvii.

1890. GRAMMOCERAS LEURUM, This Monogr., Pl. xxxiii, figs. 5—10, p. 195.

1902. PLEYDELLIA LEURA, Emend. Amm. Nom., p. 4.

Remarks.—The two specimens figured as *Grammoceras leurum* in Pl. XXXIII differ in details of suture line: the larger one is brevilatilobate, the smaller one is sublongi-subangustilobate. On the test of the smaller example, however, are certain marks, and there are also some slight irregular markings around the periphery; so perhaps this specimen is not quite normal, owing to some injury.

Date of Existence.—*Aalensis* hemera.

4. PLEYDELLIA COMATA, *S. Buckman*. Suppl., Plate X, figs. 11—13.

Description.—Obscuriparvicostate to striate; angustumbilicate.

Distinction.—From *P. leura*, smaller, less distinct ornament.

Locality and Stratum.—Dorset: Burton Bradstock, high up in Yeovil Sands.

Date of Existence.—*Aalensis* hemera.

The following species belong to several series which cannot at present be more definitely separated. They are placed here for convenience.

5. PLEYDELLIA? SUBCOMPTA? (*Branco*). Plate XXX, figs. 13, 14; Suppl., Fig. 117, p. clxvii.

1890. GRAMMOCERAS SUBCOMPTUM, This Monogr., Pl. xxx, figs. 13, 14; p. 198.

1902. PLEYDELLIA SUBCOMPTA, Emend. Amm. Nom., p. 4.

Remarks.—The side view is drawn too flat, and the peripheral view not stout enough. The identification with Branco's species is very doubtful.

6. PLEYDELLIA? sp. A., Plate XXX, figs. 11, 12; Suppl., Fig. 118, p. clxvii.

1890. GRAMMOCERAS SUBCOMPTUM, This Monogr., Pl. xxx, figs. 11, 12; p. 198.

Remarks.—A much compressed shell, much thinner than the last.

7. PLEYDELLIA ? MACTRA ? (*Dumortier*). Plate XXX, figs. 3, 4; Suppl., Fig. 119, p. clxvii.

1890. GRAMMOCERAS MACTRA, This Monogr., Pl. xxx, figs. 3, 4; p. 176.

1902. PLEYDELLIA MACTRA, Emend. Amm. Nom., p. 4.

Remarks.—The identification is by no means satisfactory, in spite of very considerable resemblance. My efforts to obtain local information concerning the type have been unsuccessful.

8. PLEYDELLIA ? sp. B., Plate XXXI, figs. 7—9; Suppl., Fig. 120, p. clxvii.

1890. GRAMMOCERAS SUBSERRODENS, This Monogr., Pl. xxxi, figs. 7—9; p. 179 (pars).

Remarks.—The shape seems the same as that of Branco's species, but the ornament differs; lacks the carina of *Pleydellia*.

LVII. Genus—WALKERIA,¹ *S. Buckman*.

(Type: *Walkeria delicata*, sp. n.)

1902. WALKERIA, Emend. Amm. Nom., p. 5.

Definition.—Subplatyleptogyral, sublatumbilicate; laterally flexiradiate; peripherally subacutanguliradiate, subfastigate, parvicarinate.

Distinction.—From *Pleydellia*, radial line more curved laterally, more projected peripherally, carina less definite, whorls less compressed.

1. WALKERIA ARCUATA, *S. Buckman*. Plate XXXII, figs. 11, 12; Suppl., Fig. 121, p. clxvii.

1890. GRAMMOCERAS, sp., This Monogr., Pl. xxxii, figs. 11, 12; p. 191.

1902. WALKERIA ARCUATA, Emend. Amm. Nom., p. 5.

Description.—Costate, showing slight decline.

Localities and Strata.—Gloucestershire: Haresfield Hill, Cephalopod Bed, upper part; Dorset: Chideock Quarry Hill, towards top of Yeovil Sands.

Date of Existence.—*Aalensis* hemera.

2. WALKERIA BURTONENSIS, *S. Buckman*. Plate XXXII, figs. 9, 10.

1890. GRAMMOCERAS AALENSE, This Monogr., Pl. xxxii, figs. 9, 10.

1902. WALKERIA BURTONENSIS, Emend. Amm. Nom., p. 5.

Description.—Costate passing to spissiparvicostate, and declining.

¹ In compliment to Mr. J. F. Walker, M.A., F.G.S.

Distinction.—From *W. arcuata*, the smaller ornamentation.

Locality and Stratum.—Dorset: Burton Bradstock, high up in Yeovil Sands.

Date of Existence.—*Aalensis* hemera.

3. *WALKERIA DELICATA*, *S. Buckman*. Suppl., Fig. 122 in text.

Description.—Spissiparvicostate declining to striate, passing to irregulari-obscuricostate.

Distinction.—From *W. burtonensis*, the decline in the ornament and the more compressed whorls.

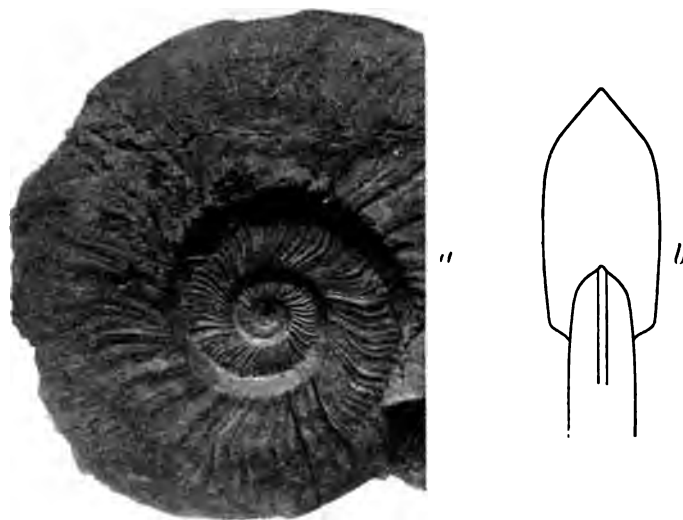


FIG. 122.—*Walkeria delicata*. a, side view; b, apertural view.

Remarks.—The type specimen I purchased from the Collection of the late Dr. T. Wright, F.R.S.

Locality and Stratum.—Dorset: Burton Bradstock, Yeovil Sands.

Date of Existence.—*Aalensis* hemera, presumably.

4. *WALKERIA*? *LOTHARINGICA*? (*Branco*.) Plate XXX, figs. 8, 9; Suppl., Fig. 123, p. clxvii.

1890. *GRAMMOCERAS LOTHARINGICUM*, This Monogr., Pl. xxx, figs. 8, 9; p. 199.

1902. *WALKERIA LOTHARINGICA*? Emend. Amm. Nom., p. 5.

Remarks.—Identification with Branco's species will not pass critical investigation.

5. *WALKERIA*? sp. Plate XXX, fig. 10; Suppl., Fig. 124, p. clxvii.

1890. *GRAMMOCERAS LOTHARINGICUM*, This Monogr., Pl. xxx, fig. 10; p. 199.

Remarks.—Like *W. delicata*, but more umbilicate.

6. *WALKERIA*? *SUBGLABRA*, *S. Buckman*. Plate XIII, figs. 7, 8 (type); Figs. 9, 10?; Figs. 125, 126, p. clxvii.

1888. *LIOCERAS OPALINUM*, This Monogr., Pl. xiii, figs. 7—10, p. 35 (pars).

1902. *WALKERIA SUBGLABRA*, Emend. Amm. Nom., p. 5.

Description.—Striate; gradumbilicate; periphery fastigate, subcarinate.

Remarks.—The generic position is not satisfactory. A specimen of an allied species from North Nibley, in my Collection, shows the same much projected radial line which is distinctive of this species but indicative of disagreement with *Walkeria*. It also shows in its umbilicus coarse, distant costæ, suddenly passing to striæ. The characters seem to indicate another genetic series.

LVIII. Genus—CANAVARINA,¹ *S. Buckman*.

(Type: *Canavarina digna*, sp. n.)

1902. *CANAVARIA*, Emend. Amm. Nom., p. 3.

Definition.—Subplaty-subleptogyral; subangustumbilicate; subpauciseptate; subbrevisubangustilobate; laterally flexiradiate, peripherally anguliradiate, convexitabulate, subcrassicarinate. (Radial line, fig. 127, p. clxvii.)

Distinction.—From preceding allied genera, which it resembles in ornament, the convexitabulate periphery and somewhat stout carina. From the genus which it resembles in these characters—*Grammoceras*, e.g. *G. audax*, *toarciense*—the difference in mode of ribbing and the smaller umbilicus.

Remarks.—Since this was penned the name chosen has been used.

1. *CANAVARINA FOLLEATA* (*S. Buckman*). Plate XXX, figs. 1, 2; Suppl., Fig. 128, p. clxvii.

1890. *GRAMMOCERAS FLUITANS*, This Monogr., Pl. xxx, figs. 1, 2; p. 190.

1902. *CANAVARIA FOLLEATA*, Emend. Amm. Nom., p. 3.

Distinction.—From *A. fluitans*, Dumortier—the costæ are smaller and less distinct, particularly in the umbilicus, which is also rather less concentric. The costæ also seem to have more lateral curve than in Dumortier's species.

Remarks.—Dr. E. Haug wrote as follows (May 22nd, 1890): “Your *Gram. fluitans* is somewhat different from the specimens of La Verpillière, which I have identified as such; they are more compressed.” He was referring to the figure in the part of this work then just published.

2. *CANAVARINA DIGNA*, *S. Buckman*. Suppl., Fig. 127, p. clxvii, and Fig. 129, p. cxlii.

1874. *AMMONITES AALENSIS*, *E. Dumortier*, Dépôts Jurass. IV, Pl. 1, fig. 3; cf. ? figs. 1, 2.

¹ In compliment to Prof. Mario Canavari.

Description.—Spissi- and connaticostate; the central whorls smooth to about 10 mm. diameter in the figured specimen.

Distinction.—From *C. folleata*, the smaller, closer set costæ; slightly more compressed whorl.

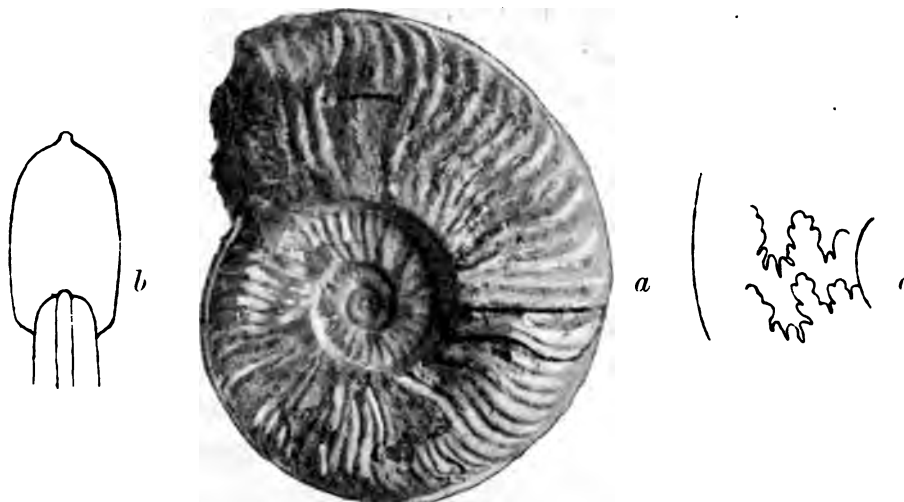


FIG. 129.—*Canavarina digna*.

Locality and Stratum.—Dorset: Burton Bradstock, Yeovil Sands, near the top.

Date of Existence.—*Aalensis* hemera.

3. CANAVARINA STEINMANNI (*Haug*). Suppl., Fig. 130 in text.

1885. HARPOCERAS STEINMANNI, *Haug*, Monogr. *Harp.*; Neues Jahrbuch für Mineral., Bl.-Bd. iii, Pl. xii, fig. 3.

Distinction.—From *C. digna*, the finer ornamentation.



FIG. 130.—*Canavarina Steinmanni* (*Haug*).

Locality and Stratum.—Dorset: Burton Bradstock [Yeovil Sands, near top].

Date of Existence.—*Aalensis* hemera, presumably.

CANAVARINA VENUSTULA (*S. Buckman*). Plate XXXI, figs. 5, 6 (type); Figs. 10—12?; Suppl., Figs. 131, 132, p. clxvii.

1890. GRAMMOCERAS SUBSERODENS, This Monogr., Pl. xxxi, figs. 5, 6; 10—12? p. 179 (pars).

1902. CANAVARIA VENUSTULA, Emend. Amm. Nom., p. 3.

Description.—Striate (coarsely); gradumbilicate; periphery fastigate, carina distinct, subacute.

Distinction.—From *C. Steinmanni*, to which it has much likeness—the smaller, finer character of the ornament, the more acute periphery, and rather less thickened carina.

Remarks.—The identification with Branco's *Amaltheus subserrodens*, though justified by the general shape, is vitiated by the coarser ornament. Branco's figure shows a smooth shell; his description speaks only of "fine growth-lines."

Date of Existence.—*Aalensis* hemera.

5. CANAVARINA?, sp. Plate XIII, figs. 4, 5; Suppl., Fig. 133, p. clxvii.

1888. LIOCERAS OPALINUM, This Monogr., Pl. xiii, figs. 4, 5; p. 35 (pars).

Remarks.—Possibly an involute development of *C. venustula*, and agrees therewith in its radial line.

The radial line is not so much curved laterally as in *Lioceras opalinum*.

Locality and Stratum.—Gloucestershire: Coaley Wood, at base of hard capping of Cephalopod Bed (not in hard bed).

Date of Existence.—*Aalensis* hemera (or ? *Opaliniformis*).

B. Septicarinata.¹

a. Non-tuberculate.

LIX. Genus—PSEUDOGRAMMOCERAS, *S. Buckman*.

(Type: *Pseudogrammoceras regale*, sp. n.)

1901. PSEUDOGRAMMOCERAS, Proc. Cotteswold Club, vol. xiv, p. 266.

1902. PSEUDOGRAMMOCERAS, Emend. Amm. Nom., p. 4.

Definition.—Subplaty-subleptogyral; latumbilicate; subdensiseptate, sublongi-sublatilobate; laterally flexiradiate; peripherally acutanguliradiate, convex to convexifastigate, altisepticarinate.² (Radial line, fig. 134, p. clxvii.)

Distinction.—From most of the genera of the *Hildoceratidæ*—the septicarina. From genera possessing this character, from *Lillia*, *Haugia*, etc.—the developed

¹ Certain otherwise similar species are included which, on account perhaps of degeneration, do not show a definite septicarina. (See p. cliii.)

² Carina bordered by sulci in some species.

rostration shown in the long projection of the radial line; from *Harpoceras* (*falciferum*-group), less lateral flexure of the radial line, the simpler suture line; from *Pseudolioceras*, radial and suture lines.

Remarks.—The typical forms of the genus are flexiradiate, but two other series are placed here for convenience—one subflexiradiate, the other rectiradiate.

In many species expansion of the umbilicus by excentric coiling may be observed. It is particularly noticeable in the leptogyral species, taking place while the umbilicus is comparatively open. Thus *P. pedicum* is subangust-umbilicate in youth and becomes latumbilicate later. One leptogyral species, *P. explicatum*, is an exception; it is latumbilicate throughout, and is an example of concentric coiling.

In many genera, the concavumbilicate Ammonites for example, and forms of the *Hyperlioceras*-type, the leptogyral species do not show expansion of umbilicus until angustumbilication has first been obtained, and often, too, not until the ribs have been lost. In *Pseudogrammoceras* the expansion of the umbilicus is associated with strong ribbing.

I. Flexiradiate.

1. PSEUDOGRAMMOCERAS QUADRATUM (*Quenstedt*), (*Haug*).

1874. AMMONITES GRUNOWI, *Dumortier* (non *Hauer*), *Basin du Rhone* IV, Pl. xiv, figs. 6, 7 only.
 1885. HILDOCERAS QUADRATUM, *Haug*, *Monogr. Harp.*; *N. Jahrb. Mineral., Beil-Bd. iii*, p. 638.
 1887. AMMONITES QUADRATUS, *Denckmann*, *Fauna von Doernten*; *Abh. Geol. Landesanstalt*, VIII, 2, Pl. vi, fig. 3.

Remarks.—There are two series of *quadratus*-like species—one in which the ribs are distinctly flexed, the other in which they are hardly curved. *Dumortier* shows both forms (Pl. xiv, figs. 6, 7; Pl. xv, figs. 1, 2). *Denckmann* shows the flexed form, agreeing with *Dumortier*'s Pl. xiv, figs. 6, 7, which I take as type-figure of the present species. I showed a flexed form, but it has coarser ribs (see *aff. quadratum*). *Brasil*¹ figured a straight-ribbed form, but it is a very massive shell, quite distinct.

Locality and Stratum.—Somerset: Shepton Beauchamp, near Ilminster, "Upper Lias."

2. PSEUDOGRAMMOCERAS *aff.* QUADRATUM. Plate XXXIV, figs. 6, 7.

1890. GRAMMOCERAS QUADRATUM, *This Monogr.*, Pl. xxxiv, figs. 6, 7, p. 201.

Remarks.—This form has coarser ribs than the last, but my material of these two forms is scanty and ill preserved.

¹ "Ceph. Nouv.," 'Bull. Soc. Géol. de Normandie,' xvi, Pl. i, figs. 9—11.

3. PSEUDOGRAMMOCERAS SUBQUADRATUM (*S. Buckman*). Plate XXXVI, figs. 3—5;
Suppl., Fig. 135, p. clxvii.

1890. GRAMMOCERAS SUBQUADRATUM, This Monogr., Pl. xxxvi, figs. 3—5.

1902. PSEUDOGRAMMOCERAS SUBQUADRATUM, Emend. Amm. Nom., p. 5.

4. PSEUDOGRAMMOCERAS THRASU, *S. Buckman*. Plate XXXVI, figs. 6—8; Suppl.
Fig. 136, p. clxvii.

1890. GRAMMOCERAS SÆMANNI, This Monogr., Pl. xxxvi, figs. 6—8.

1902. PSEUDOGRAMMOCERAS THRASU, Emend. Amm. Nom., p. 5.

Description.—Subplaty-subleptogyral, subcrassicostate to costate, periphery convexitabulate.

Distinction.—From *P. subquadratum*, the less coarse ornamentation, and the more oligogyral character; from *P. Sæmanni*, see p. cxlix, below.

Locality and Stratum.—Gloucestershire: Coaley Wood, Bed 8, p. 45 (by matrix).

5. PSEUDOGRAMMOCERAS BINGMANNI (*Denckmann*). Plate XXXIV, figs. 3—5; Suppl.,
Fig. 137, p. clxvii.

1890. GRAMMOCERAS FALLACIOSUM, *var.* BINGMANNI, This Monogr., Pl. xxxiv,
figs. 3—5.

1902. PSEUDOGRAMMOCERAS BINGMANNI, Emend. Amm. Nom., p. 4.

Remarks.—Denckmann's two examples differ—one (Pl. v, fig. 4) is more umbilicate and less coarsely costate than the other (Pl. vi, fig. 5). My examples agree in proportions with the first, in costation more with the second.

Distinction.—From *P. thrasu*, thinner, and with a more fastigate periphery.

Locality and Stratum.—Gloucestershire: Coaley Wood, Bed 7, p. 45.

6. PSEUDOGRAMMOCERAS REGALE, *S. Buckman*. Suppl., Figs. 134 (p. clxvii), 138
(p. cxlvi).

Description.—Subplaty-subleptogyral, latumbilicate, subspissicostate, periphery convexifastigate.

Distinction.—From *P. Bingmanni*, thinner, more finely ribbed, and with a slightly larger umbilicus.

Remarks.—Is too thin for Denckmann's *Ammonites Bingmanni* in his Plate v, fig. 4.

Mr. G. C. Crick, F.G.S., kindly compared my figured example with Wright's *Harpoceras radians* in his Plate lxxiv, figs. 1, 2, and writes: "I believe it to be specifically distinct." See *P. Struckmanni*, p. cxlviii, below.

Localities and Strata.—Gloucestershire : Coaley Wood (Bed 7, p. 45) ; Somerset : Maes Knoll, Dundry (Bed 7, p. 687, vol. lii, 'Quart. Journ. Geol. Soc.').

Date of Existence.—*Struckmanni* hemera.

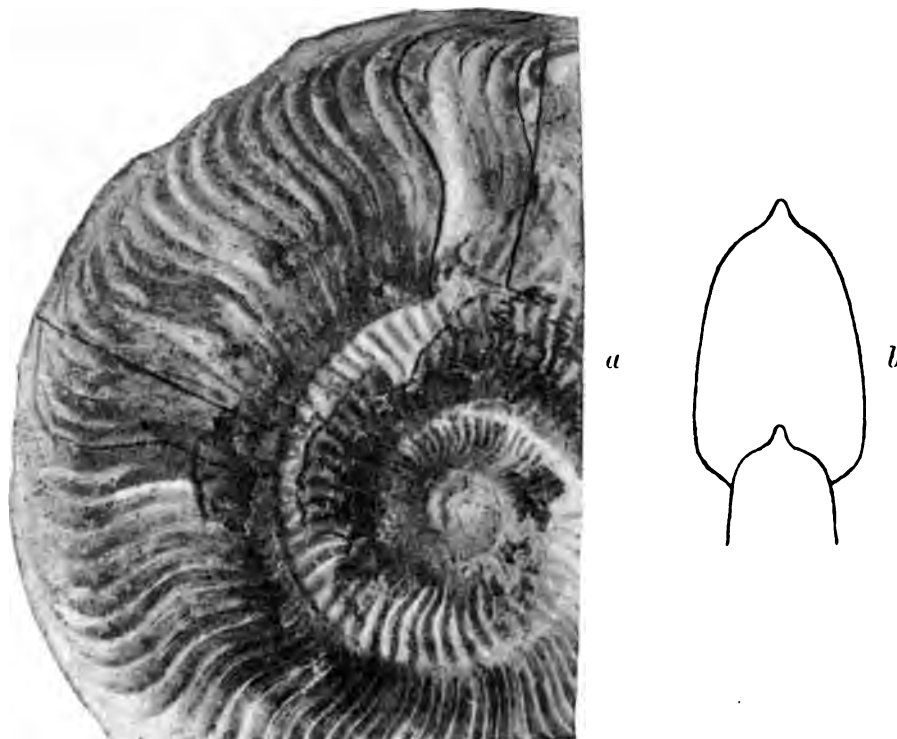


FIG. 138.—*Pseudogrammoceras regale*, 117 mm. diam.

II. Subflexiradiate.

Tenuia.

7. *PSEUDOGRAMMOCERAS EXPLICATUM*, *S. Buckman*. Plate XXVIII, figs. 14, 15 ;
Suppl., Fig. 139, p. clxvii.

1890. *GRAMMOCERAS TOARCENSE-STRIATULUM*, This Monogr., Pl. xxviii, figs. 14, 15.

1902. *PSEUDOGRAMMOCERAS EXPLICATUM*, Emend. Amm. Nom., p. 4.

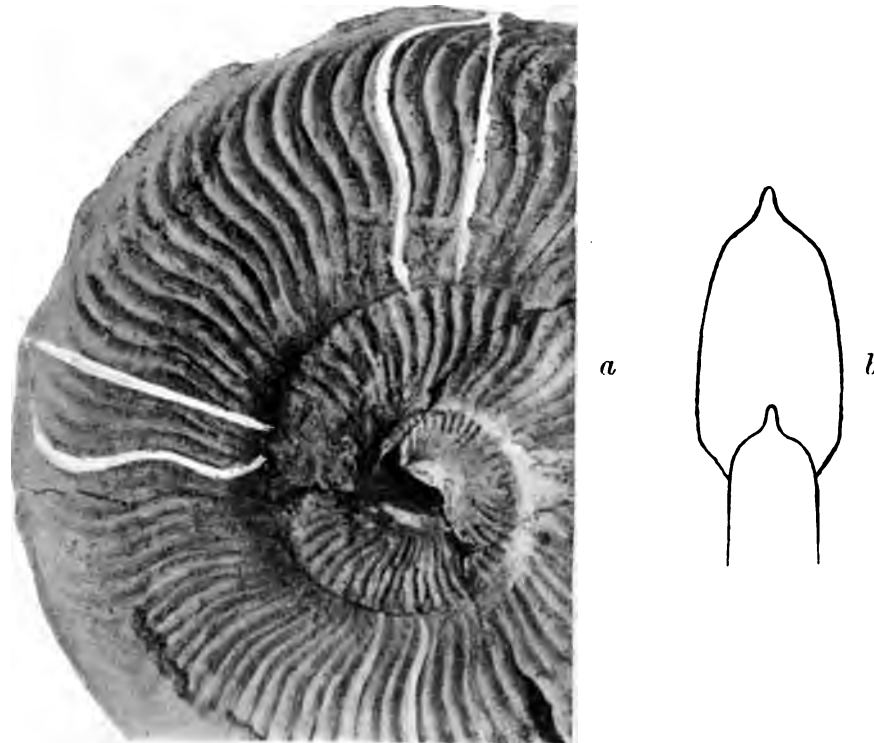
Description.—Subplatyleptogyral, latumbilicate, costate.

Remarks.—Further investigation has shown that the figured example has really a hollow carina—it is septicarinate. Therefore it must be removed from association with *Grammoceras toarciense* and brought into connection with the *Struckmanni* series. The term "*toarcense-striatulum*" was intended to be merely descriptive, not a definite specific title. The placing of "*S. Buckman*" after it was an editorial "correction" of a supposed omission.

Locality and Stratum.—Gloucestershire: Little Sodbury, Bed 18, p. 165. (? Batcombe, near Shepton Mallet, Upper Lias, but specimen not yet sufficiently freed from matrix).

8. PSEUDOGRAMMOCERAS PEDICUM, *S. Buckman*. Suppl., Fig. 140 in text.1882. ? HARPOCERAS RADIANS, *Wright*, Pl. lxiv, figs. 5—7.1885. ? AMMONITES RADIANS DEPRESSUS, *Quenstedt*, Amm. Schwäb. Jura, Pl. lii, fig. 6.1902. HARPOCERAS FALLACIOSUM, var. cf. BINGMANNI, *Janensch*, Jur. Elsass; Abh. Geol. Spez. K. Elsass-Lothr., N.F., H. 5, Pl. vii, fig. 2.

Description.—Subplatyleptogyral, sublatumbilicate; subspissi-subcrassicostate; periphery convexifastigate.

FIG. 140.—*Pseudogrammoceras pedicum*, 113 mm. diam.

Distinction.—From *Grammoceras fallaciosum*, Bayle; the costæ are larger and have a distinct lateral curvature.

Locality and Stratum.—Gloucestershire: Coaley Wood, Bed 8, p. 45.

9. PSEUDOGRAMMOCERAS SUBFALLACIOSUM, *S. Buckman*. Plate XXXIII, fig. 17, 18; Suppl., Fig. 141, p. clxvii.1874. AMMONITES ESERI, *Dumortier*, vol. iv, Pl. xii, fig. 3.cf. 1885. AMMONITES RADIANS, *Quenstedt*, Amm. Schwäb. Jura, Pl. liv, fig. 56.1890. GRAMMOCERAS FALLACIOSUM, *This Monogr.*, Pl. xxxiii, figs. 17, 18.1902. PSEUDOGRAMMOCERAS SUBFALLACIOSUM, *Emend. Amm. Nom.*, p. 5.

Description.—Subplatyleptogyral, sublatumbilicate, spissicostate, periphery convexifastigate.

Distinction.—From *Gram. fallaciosum*, Bayle, slight lateral flexure of costæ, less distinct costæ, more oligogyral character of the inner whorls. From *P. pedicum*, smaller, more closely set costæ, slightly thinner whorls.

Remarks.—The ribs are slightly flexed laterally. They are more distinct than shown in Plate XXXIII, fig. 17.

Localities and Strata.—Gloucestershire: Coaley Wood, Bed 8, p. 45 (by matrix); Stinchcombe and Cam Down, lower part of Cephalopod Bed. Somerset: White Lackington, Upper Lias—'Quart. Journ. Geol. Soc.,' vol. xlv, p. 450 (1889), 1 ft. 7 in. from top of Bed 4. Foreign.—France: "Milhau, Lias supérieur" (Sturtz).

10. *PSEUDOGRAMMOCERAS EXPEDITUM*, *S. Buckman*. Pl. XXXIV, figs. 10, 11; Pl. XXXV, fig. 7; Suppl., Fig. 142 in text (Type).

1890. *GRAMMOCERAS FALLACIOSUM*, var. *COTTESWOLDIÆ*, This Monogr., Pl. xxxiv, figs. 10, 11; Pl. xxxv, fig. 7.

1902. *PSEUDOGRAMMOCERAS EXPEDITUM*, Emend. Amm. Nom., p. 4.

1902. *HARPOCERAS FALLACIOSUM*, var. *COTTESWOLDIÆ*, *Janensch*, Jur. Elsass; Pl. vii, fig. 1.

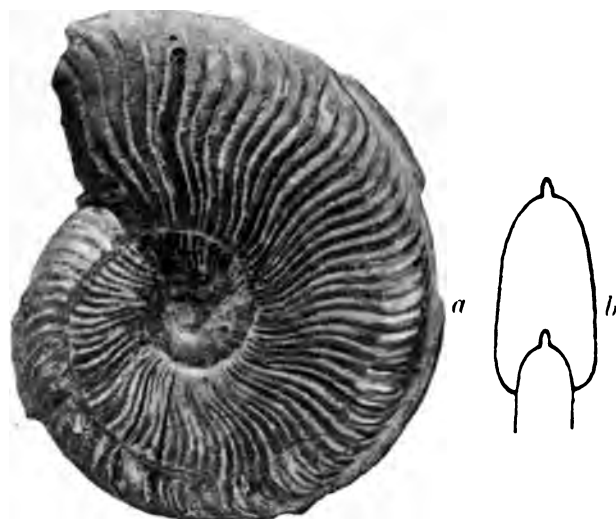


FIG. 142. *Pseudogrammoceras expeditum*.
a, side view; b, sectional view.

Description.—Platyleptogyral, subangustumbilicate, spissicostate.

Remarks.—Compressed flat-sided whorls and a rapid increase in the diameter of the shell are particular features of this species.

Distinction.—From *P. pedicum* and *P. subfallaciosum*, smaller umbilicus.

Localities and Strata.—Gloucestershire, Stinchcombe, Cephalopod Bed; Coaley Wood: Bed 8, p. 45. Somerset: Maes Knoll (Dundry), Bed 7—'Quart. Journ.

Geol. Soc.,' vol. 52, p. 687. Foreign: "Avec *G. striatulum*, Tilly-s.-Seulles" (Dr. L. Brasil); "Milhau, Aveyron, Lias supérieur" (Sturtz).

11. *PSEUDOGRAMMOCERAS STRUCKMANNI* (*Denckmann*). Suppl., Fig. 143, p. clxvii.

1883. *HARPOCERAS RADIANS*, *Wright* (non *Reinecke*), Monogr. Lias Ammonites, Pl. lxxiv, figs. 1, 2.

1887. *AMMONITES STRUCKMANNI*, *Denckmann*, Fauna von Doernten, Pl. iii, fig. 1, p. 72.

1890. GRAMMOCERAS FALLACIOSUM, var. STRUCKMANNI, This Monogr., pp. 206,
207 (pars).

Remarks.—Wright gives (*loc. cit.*) a figure of a grand specimen, which I identify with Denckmann's species. With Wright's example Mr. G. C. Crick very kindly compared a specimen from my cabinet. He considered it, as I expected, the same species. He notes, however, "the [varying] curvature of the ribs in Wright's figure is not correct; all the ribs are curved in the lateral area."

The radial line (fig. 143, p. clxvii) has been taken from my specimen mentioned above.

Distinction.—From *P. pedicum*, stouter whorls, broader ribs, and more concentric umbilicus.

The distinctions from *A. Bingmanni* are, according to Denckmann (*loc. cit.*, p. 79), that this species is decidedly thinner and not so high-mouthed (*hochmundig*), also it increases very slowly. The ribs have not, as in *A. Bingmanni*, quite so distinct a bend in the first third of their length.

Localities and Strata.—Gloucestershire: Coaley Wood (Bed 7, p. 45); Stinchcombe, Cephalopod Bed, lower part; Buckholt Wood, near Stroud, Cephalopod Bed, (L. Richardson, F.G.S.). Wright does not give the locality of his example.

12. PSEUDOGRAMMOCERAS COTTESWOLDIÆ (*S. Buckman*). Plate XXXV, figs. 4—6;
Suppl., Fig. 144, p. clxvii.

1890. GRAMMOCERAS FALLACIOSUM, var. COTTESWOLDIÆ, This Monogr., Pl. xxxv,
figs. 4—6

1902. PSEUDOGRAMMOCERAS COTTESWOLDIÆ, Emend. Amm. Nom., p. 5.

1902. HÆPOCERAS FALLACIOSUM, var. MUELLERI, *Janensch*, Jur. Elsass; Pl. vii,
fig. 3.

Distinction.—From *P. expeditum*, which it resembles in general shape, decidedly stouter, and with gibbous-sided whorls.

Localities and Strata.—Gloucestershire: Buckholt Wood (Frocester), Bed 6, p. 164; Sodbury, Bed 11, p. 164. Foreign.—France: "Tilly sur Seules, *toarcense*," from Dr. L. Brasil; "Milhau, Aveyron, Toarcien" (purchased); "Besançon, Toarcien" (purchased).

Pinguia.

13. PSEUDOGRAMMOCERAS SÆMANNI (*Dumortier*). Suppl., Fig. 145 in text.

1874. AMMONITES SÆMANNI, *Dumortier*, Dépôts Jurassiques, vol. iv, Pl. xiii,
figs. 4—6.

Remarks.—Dumortier only figures a fragment, but it has special characteristics—a tabulate carinati-sulcate periphery. It was not right to identify with this

species examples which lacked such characteristics ; hence the identifications in the body of this work are invalid.

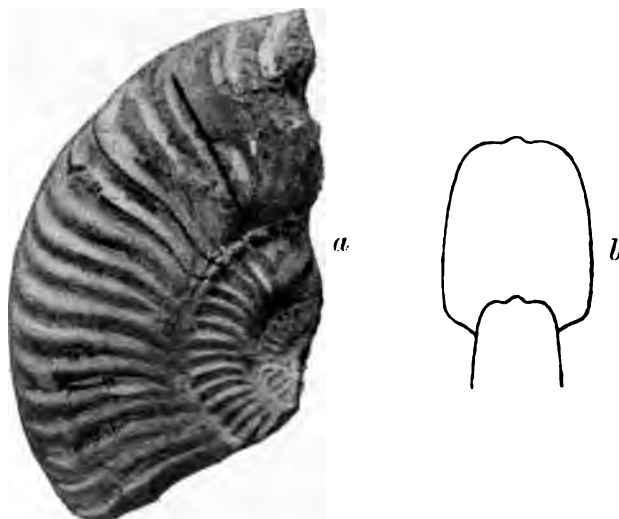


FIG. 145.—*Pseudogrammoceras Sæmanni* (Dumortier).

Locality and Stratum.—Gloucestershire : Wotton-under-Edge, Cephalopod Bed (from Mr. Charles Upton).

14. *PSEUDOGRAMMOCERAS OBESUM*, *S. Buckman*. Suppl., Fig. 146 in text.

Description.—Subplaty-subleptogyral, sublatumbilicate, costate, periphery convex.

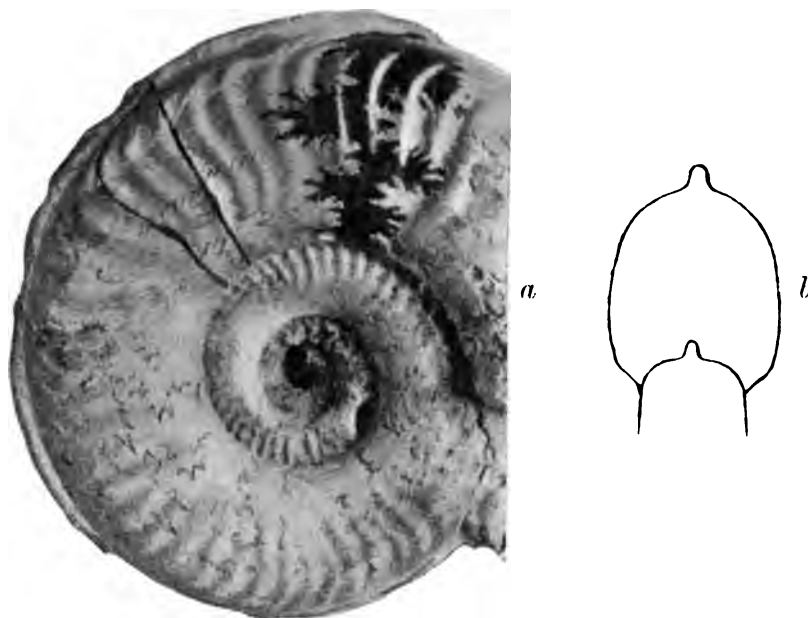


FIG. 146.—*Pseudogrammoceras obesum*, 82 mm diam.

Distinction.—Lacks the furrows and the broad tabulate periphery of *P. Sæmanni*.

Locality and Stratum.—Somerset : Shepton Beauchamp, Upper Lias. I collected the figured specimen from the north side of the cutting in the road leading from Shepton to Bostone Hill in strata with *Hildoceras*. Its position below the beds yielding species of the *Haugia jugosa*-type attracted my attention at the time, being quite out of accord with that of other species of its genus.

Date of Existence.—Lilli hemera.

15. PSEUDOGRAMMOCERAS PACHU, *S. Buckman*. Plate XXXIV, figs. 1, 2; Fig. 147, p. clxvii.

1887. ? AMMONITES SÆMANNI, *Denckmann*, Fauna von Doernten, Pl. iii, fig. 2.

1890. GRAMMOCERAS SÆMANNI, *This Monogr.*, Pl. xxxiv, figs. 1, 2.

1902. PSEUDOGRAMMOCERAS PACHU, *Emend. Amm. Nom.*, p. 4.

Description.—Subplaty-subleptogyral, sublatumbilicate, subspissicostate, periphery convex.

Distinction.—From *P. obesum*, the umbilicus is less concentric—it begins with a smaller centre; the whorls are somewhat flattened on the side, not slightly gibbous; the ribs are more flattened, more approximate, and slightly different in curve.

Locality and Stratum.—Gloucestershire: Cam Down, Dursley, Cephalopod Bed, lower part—a much ironshot matrix.

16. PSEUDOGRAMMOCERAS MUELLERI (*Denckmann*). Plate XXXIV, figs. 8, 9; Plate XXXV, figs. 1—3; Suppl., Figs. 148, 149, p. clxvii.

1890. GRAMMOCERAS MUELLERI, *This Monogr.*, Pl. xxxiv, figs. 8, 9; Pl. xxxv, figs. 1—3.

1902. PSEUDOGRAMMOCERAS MUELLERI, *Emend. Amm. Nom.*, p. 4.

Remarks.—My young specimen differs from *Denckmann's* in having the periphery a trifle narrower and more compressed, and not showing the indications of furrows which he speaks of.

III. Rectiradiate.

17. *PSEUDOGRAMMOCERAS FALLACIOSUM* (Bayle). Suppl., Fig. 150 in text.

1878. *GRAMMOCERAS FALLACIOSUM*, Bayle, Explic. Carte géol. France, Pl. lxxviii, figs. 1, 2.

1885. *AMMONITES RADIANS*, Quenstedt, Amm. Schwäb. Jura, Pl. li, fig. 4.

Remarks.—A particular feature of Bayle's figure is the straightness of the costæ on the lateral area. The example now figured is the only one at all like

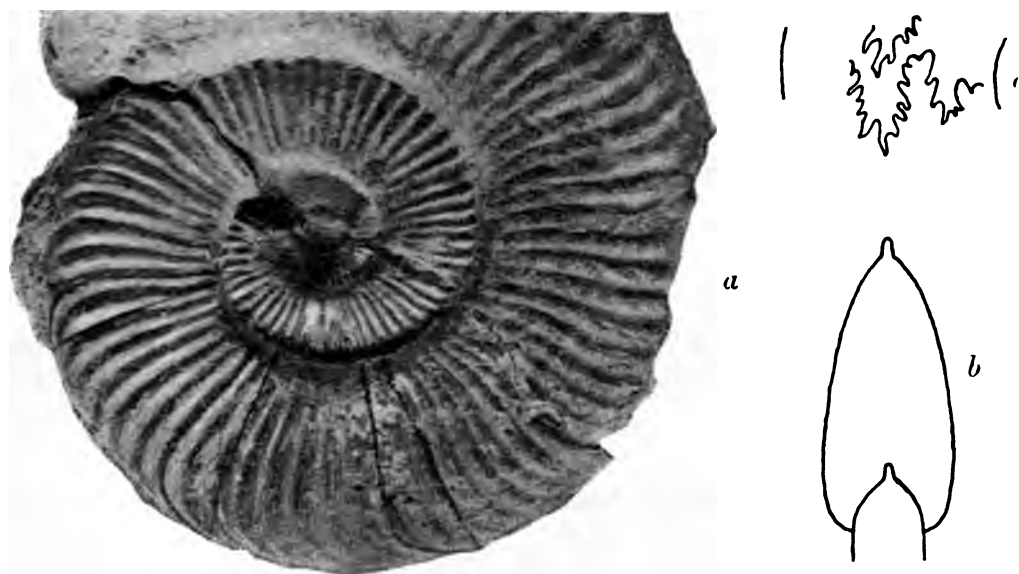


FIG. 150.—*P. fallaciosum* (Bayle). a, side view. b, section. c, part of suture lines.

Bayle's in other respects which also possesses this feature. Whether it is so compressed as Bayle's specimen is difficult to decide on account of that author's figure. Quenstedt figures a large example in which the recticostate character is noticeable.

Locality and Stratum.—Gloucestershire: Stinchcombe Hill, Cephalopod Bed.

18. *PSEUDOGRAMMOCERAS*, sp.

1882. *HARPOCERAS RADIANS*, Wright, Lias Ammonites, Pl. lxiv, figs. 1—3.

Remarks.—Wright's figs. 1—3 (Plate lxiv) represent a noticeably coarser,

more distant ribbed fossil than Bayle's *G. fallaciosum*. It is also presumably a rather thicker fossil than his; but on this point Bayle gives little opportunity for judgment.

Localities and Stratum.—Gloucestershire: Little Sodbury, in sandstone. Wright quotes his specimen from Frocester Hill.

Species not showing Septicarina.

The suture line particularly indicates that the following species are closely related to *Pseudogrammocer*s; radial line and general appearance support it. But they lack the septicarina. This may be due to degeneration, but such degeneration in the costate stage is unusual.

The radial line and the more lobate suture line separate this series from *Grammoceras*.

19. PSEUDOGRAMMOCERAS ? DOERNTENSE (*Denckmann*). Plate XXIX, figs. 1—5;
Suppl., Fig. 151, p. clxvii.

1890. GRAMMOCERAS DOERNTENSE, This Monogr., Pl. xxix, figs. 1—5, only;
pp. 182—184 (pars).

1902. PSEUDOGRAMMOCERAS DOERNTENSE, Emend. Ann. Nom., p. 4.

Remarks.—Denckmann's fig. 4, in his Pl. viii, may be taken as the type; his fig. 5 is distinctly coarser ribbed.

20. PSEUDOGRAMMOCERAS ? PLACIDUM. *S. Buckman*. Plate XXIX, figs. 8—10 (Type);
Plate XXXIII, figs. 11, 12;
Suppl., Fig. 152, p. clxvii.

1890. GRAMMOCERAS DOERNTENSE, var., This Monogr., Pl. xxix, figs. 8—10;
Pl. xxxiii, figs. 11, 12.

1902. PSEUDOGRAMMOCERAS PLACIDUM, Emend. Ann. Nom., p. 5.

Description.—Substeno-subleptogyral, perlatumbilicate; parvicostate to striate. Immature example (Pl. XXXIII, figs. 11, 12)—Subplaty-subleptogyral; latumbilicate.

Distinction.—From *G. doerntense*, the smaller, regular ribs, and the more acute periphery.

21. PSEUDOGRAMMOCERAS ? sp. Plate XXIX, figs. 6, 7; Suppl., Fig. 153, p. clxvii.

GRAMMOCERAS DOERNTENSE, This Monogr., Pl. xxix, figs. 6, 7; pp. 182—184 (pars).

Remarks.—More compressed and less costate than *P. doerntense*, and it has a less projected radial line. Its generic position is quite uncertain.

DATES OF EXISTENCE OF *Pseudogrammoceras*.

Since the species were first described attempts have been made towards more exact chronology; for instance, the term "*Dispansum* beds" was found to be too wide. The following table summarises the dates, by hemeræ, so far as present information allows.

DISPANSI.—(Genus, *Phlyseogrammoceras*, see below).

STRUCKMANNI.—*Pseudogrammoceras quadratum* ? aff. *quadratum*, *subquadratum*, *Bingmanni*, *regale*, *Struckmanni*, *Muelleri*, *doerntense*, *placidum*.

STRIATULI.—Late :¹ *P. thrasu* ? *pedicum*, *subfallaciosum*, *expeditum*, *Cotteswoldiæ*, *Sæmanni* ? *pachu* ? *fallaciosum* ? Early : *P. explicatum*.

VARIABILIS.

LILLI.—*P. obesum*; (*Hildoceras semipolitum*).

BIFRONTIS.—(*Hildoceras bifrons*).

b. *Tuberculate*.

LX. Genus—PHLYSEOGRAMMOCERAS,² S. Buckman.

(Type : *Phlyseogrammoceras mettalarium*,³ Dumortier, sp.)

1901. PHLYSEOGRAMMOCERAS, Proc. Cotteswold Club, vol. xiii, p. 266 (misprint).

1902. PHLYSEOGRAMMOCERAS, Emend. Amm. Nom., p. 4.

Definition.—Platyleptogyral, subangustumbilicate ;⁴ laterally parvibullate, flexiradiate ; peripherally acutanguliradiate, septicarinate. (Radial line, fig. 154, p. clxvii.)

¹ Date of Ammonites of the *Haugia Eseri*-type ; and see Ammonite sequence given in "Dundry Hill," 'Quart. Journ. Geol. Soc.,' vol. lii, p. 688, footnote 2.

² Φλύσις, a breaking out.

³ The species figured in Pl. XXXVI, figs. 1, 2, is the type of the genus.

⁴ Becoming latumbilicate by excentric coiling in catagenetic species.

Distinction.—From *Pseudogrammoceras*—the tuberculate ornament; from *Phymatoceras*—the longer projection of the radial line on the periphery. From genera of similar appearance which possess the tuberculate ornament—the septicarina.

1. PHLYSEOGRAMMOCERAS METALLARIUM (*Dumortier*). Plate XXXVI, figs. 1, 2.

1890. GRAMMOCERAS METALLARIUM, This Monogr., Pl. xxxvi, figs. 1, 2.

1902. PHLYSEOGRAMMOCERAS METALLARIUM, Emend. Amm. Nom., p. 4.

Date of Existence.—*Dispansi* hemera.

2. PHLYSEOGRAMMOCERAS DISPANSUM (*Lycett*). Plate A, figs. 41, 42.

1890. GRAMMOCERAS DISPANSUM, This Monogr., Pl. A, figs. 41, 42; p. 211.

3. PHLYSEOGRAMMOCERAS ORBIGNYI (*S. Buckman*). Plate XXVII, figs. 3—6 (figs. 3, 4, Type); Suppl., Fig. 155, p. clxvii.

1890. GRAMMOCERAS ORBIGNYI, This Monogr., Pl. xxvii, figs. 3—6; p. 184.

1902. PHLYSEOGRAMMOCERAS ORBIGNYI, Emend. Amm. Nom., p. 4.

Correction, p. 184.—The small carina is not exactly solid; it is really a degenerate form of a hollow carina. There are traces of the septum in certain cases, though the hollow character is obliterated.

Remarks.—The interpretation of this species seems to be that it is a latumbilicate descendant of *P. metallarium*, but that it does not come through *P. dispansum*. The latumbilication arises from excentric coiling (outcoiling) beginning before any great degree of angustumbilication has been attained. In many cases among Hildoceratidæ the incoiling which produced angustumbilication is carried much farther, even to concavumbilication, before outcoiling commences. In *P. dispansum* angustumbilication (incoiling) is carried farther than in this species.

The following work contains figures of species belonging to the *Gammiradiata* series :—

1898. *Benecke*, Beitr. Kennt. Jura Deutsch-Lothr.; Abh. Spez.-Karte Elsass-Lothr.; N. F., Heft I.

End of *Gammiradiata* series.

FALCIRADIATE.

Nonsepticarinata.

LXI. Genus—HILDOCERAS, Hyatt.

1889. HILDOCERAS, This Monogr., p. 111. For radial line see Pl. A, fig. 30.

1. HILDOCERAS SEMIPOLITUM, S. Buckman. Plate XXII, figs. 30, 31; Plate A, fig. 28.

1889. HILDOCERAS BIFRONS, This Monogr., Pl. xxii, figs. 30, 31; Pl. A, fig. 28.

1902. HILDOCERAS SEMIPOLITUM, Emend. Amm. Nom., p. 4.

Remarks.—The characters of the species are the inclusion up to the lateral sulcation, giving thereby a smooth central area; the numerous small costæ, the compression of the whorl.

Common low down in Cotteswold Sands (*vide* Bed 17, Section p. 45, as *H. bifrons*, and footnote) of many localities of the Cotteswolds. In Upper Lias clay = argillaceous condition of Cotteswold Sands at Overbury (Worcestershire). Not yet found in that Upper Lias which lies below Cotteswold Sands, as at Stinchcombe.

Date of Existence.—*Lilli hemera*.

Septicarinata.

LXII. Genus—VACEKIA,¹ S. Buckman.

(Type : *Vacekia Stephensi*, sp. n.)

1899. VACEKIA, This Monogr., Expl. of Suppl., Pl. X.

Definition.—Subplaty-subleptogyral, sublatumbilicate; subdensiseptate, sublongi-sublatilobate; laterally anguliradiate; peripherally peracutanguliradiate, tabulate, subalti-septicarinate. (Radial line, fig. 156, p. clxvii.)

Distinction.—The radial curve, with its extreme length of peripheral projection. The only comparable genus from this point of view is *Harpoceras*, but that has neither so long a peripheral projection nor so much lateral curvature of the radial line.

Remarks.—In his work, "Ueber die Fauna der Oolithe von Cap S. Vigilio" ('Abh. der K. K. Geol. Reichsanstalt,' Bd. xii, No. 3, 1886), Vacek figures (pl. viii, figs. 3, 9) certain specimens which appear to show a radial curve comparable with that of the present genus. It is possible, therefore, that *Vacekia* would be their correct genus, but they are not the same species as the one now under consideration.

¹ In compliment to Dr. M. Vacek.

No other figured species with which I am acquainted seems to have any resemblance when proportions and the radial curve are considered, so that the species to be described appears to belong to a particularly scarce series.

1. *VACEKIA STEPHENSI*, *S. Buckman*. Suppl., Plate X, figs. 17—19; Suppl., Fig. 156, p. clxvii; Fig. 162 in text.

Description.—Given under the generic definition. The ornament consists of very obscure but somewhat distant costæ, which later become definite and more numerous.

Remarks.—Since this species was first figured another example has been found in a parcel of specimens collected some years ago. As this example is larger and gives important additional features, a figure is inserted in the text. The development of the costæ is noteworthy in this example.

This species has a certain resemblance in general features to *Asthenoceras nannodes* (see p. xlix); and this is remarkable considering that the date of existence is about the same. But, apart from the great difference in the radial curve, this species is much less umbilicate, and has a distinctly tabulate periphery.

Locality and Stratum.—Dorset: Bradford Abbas, and, judging by the matrix, from the Paving Bed; Stoke Knap, from the Building Stone.

Date of Existence.—*Bradfordensis* hemera. The find at Stoke Knap fixes the date as not earlier than that; the Paving Bed of Bradford Abbas is not later.



FIG. 162.—*Vacekia stephensi*.
Building Stone, Stoke
Knap, Dorset.

SUBFALCIRADIATE.

Nonsepticarinate.

LXIII. Genus—POLYPLECTUS, *S. Buckman*.

1890. POLYPLECTUS, This Monogr., p. 214.

Remarks.—A genus closely connected with *Harpoceras*, and the absence of a septicarina perhaps due to degeneration. The much less falcate radial line (Fig. 158, p. clxvii.) is a good distinction from that genus.

1. POLYPLECTUS DISCOIDES (*Zieten*). Plate XXXVII, figs. 1—5; Suppl., Fig. 157, p. clxvii.

1890. POLYPLECTUS DISCOIDES, This Monogr., p. 215.

Septicarinata.

LXIV. Genus—PSEUDOLIOCERAS, *S. Buckman.*

1889. PSEUDOLIOCERAS, *This Monogr.*, p. 81.

Distinction.—From Lioceratoid genera, the septicarina; from *Harpoceras* or *Vacekia*, the radial line (Fig. 158, p. clxvii).

Remarks.—As the type of the genus I take the species figured by Blake (Yorkshire Lias, Plate viii, fig. 6) as *Harpoceras compactile*, and consider this example to be the type of the species, since this is the first delineation.

Correction.—The idea of this genus being the ancestor of *Hyperlioceras* must be rejected. The two genera are really morphic equivalents, easily distinguishable, however, by their radial lines, as well as by the greater persistence of costation in *Pseudolioceras*.

1. PSEUDOLIOCERAS GRADATUM, *S. Buckman.* Plate XX, figs. 3, 4; Suppl., Fig. 159, p. clxvii.

1889. PSEUDOLIOCERAS COMPACTILE, *This Monogr.*, Pl. xx, figs. 3, 4; p. 85.

Description.—Gradumbilicate, costate; and see p. 85.

Remarks.—Must be separated from *P. compactile* on account of its gradumbilicus and its rectangular inner margin. See p. 86.

Locality and Strata.—Gloucestershire: Coaley Wood, Bed 17, Section vi, p. 45. North Nibley, Bed 28 or 30, Section vii, p. 46.

Date of Existence.—*Lilli hemera.*

2. PSEUDOLIOCERAS DUMORTIERI, *S. Buckman.*

1874. AMMONITES LYTHENSIS, *Dumortier* (non *Young & Bird*), Bassin du Rhône, IV, Pl. xi, figs. 9, 10.

1889. PSEUDOLIOCERAS COMPACTILE, *This Monogr.*, p. 85 (pars).

Description.—Perangustumbilicate, but gradumbilicate, inner margin rectangular; costate; periphery narrow, subtabulate.

Distinction.—From *P. gradatum*, the smaller umbilicus, narrower periphery, slightly more compressed whorls.

Remarks.—The largest specimen of this species is the size of the *P. gradatum*, Plate XX, fig. 3. To obtain an idea of this species give to that view of *P. gradatum* the umbilicus of Fig. 5.

Dumortier's figure represents the species well, except that the last three ribs are too coarse.

Locality and Stratum.—Gloucestershire: North Nibley, Bed 28 or 30, Section vii, p. 46. This is commoner than the other species.

Date of Existence.—Lilli hemera.

3. PSEUDOLIOCERAS PUMILUM, *S. Buckman*. Pl. xx, figs. 5, 6.

1889. PSEUDOLIOCERAS COMPACTILE, This Monogr., Pl. xx, figs. 5, 6.

1902. — PUMILUM, Emend. Amm. Nom., p. 5.

Description.—Perangustumbilicate, with tendency to widen; gradumbilicate, inner margin rectangular; costate; periphery somewhat narrow, with tendency to broaden, penetabulate.

Distinction.—From *P. gradatum*, a smaller umbilicus, a broader periphery, with more distinct areas each side of a less prominent carina. From *P. Dumortieri*, broader and more tabulate periphery.

Remarks.—This species shows signs of hypostrophy—in the tendency to excentrumbilication, broadening of periphery, and tendency to increase thickness of whorl. It is, perhaps, a gerontic form of *P. Dumortieri*.

Locality and Stratum.—Gloucestershire: North Nibley, Bed 28, Section vii, p. 46.

Date of Existence.—Lilli hemera.

4. PSEUDOLIOCERAS COMPACTILE (*Simpson*).

1889. PSEUDOLIOCERAS COMPACTILE, This Monogr., p. 85 (pars).

1902. HARPOCERAS (PSEUDOLIOCERAS) COMPACTILE, *Janensch*, Jur. Elsass; Abh. Geol. Spez.-Karte-Elsass-Lothr., N.F., H. 5, Pl. v, fig. 5.

Distinction.—From *P. gradatum*, the concavumbilicus.

Notes.—Remove from the synonymy, p. 85, *Amm. lythensis*, *falcodiscus*, and *compactile* (*Haug*). Remove the references to plates of this Monograph. Transfer description to *P. gradatum*.

Remarks.—A sloping inner margin and a regular concavumbilicus characterise this species according to Blake's figure and description. See p. 86 of this Monograph.

Apparently Denckmann's *A. Wurttenbergeri* cannot be separated from this species; at least, it has the same concavumbilicus as Blake's figure.

Distinction.—From *P. gradatum*, the concavumbilicus.

Localities and Strata.—Gloucestershire: Coaley Wood, Bed 7 of Section vi, p. 45, a specimen 113 mm. in diameter; North Nibley, Cephalopod Bed.

Date of Existence.—*Struckmanni* hemera.

5. PSEUDOLIOCERAS FALCIDISCUS (*Quenstedt*).

1885. AMMONITES FALCIDISCUS, *Quenstedt*, *Amm. Schwäb. Jura*, Pl. liv, fig. 24 only.

1889. PSEUDOLIOCERAS COMPACTILE, *This Monogr.*, p. 85 (pars).

Distinction.—From *P. gradatum*, the concavumbilicus, and the carina less definitely separated from the periphery. From *P. compactile*, the larger umbilicus, and the more distinct costæ.

Locality and Stratum.—Gloucestershire: Stinchcombe Hill, towards base of Cephalopod Bed.

Date of Existence.—*Striatuli*, or *Struckmanni* hemera.

6. PSEUDOLIOCERAS BEYRICHI (*Schloenbach*). Plate XX, figs. 7, 8; Plate A, fig. 22; Suppl., Fig. 160, p. clxvii.

1889. PSEUDOLIOCERAS BEYRICHI, *This Monogr.*, Pl. xx, figs. 7, 8; Pl. A, fig. 22; p. 87 (pars).

Locality and Stratum.—Gloucestershire: Coaley Wood, upper part of Cephalopod Bed.

Date of Existence.—*Aalensis* hemera, probably.

7. PSEUDOLIOCERAS REPLICATUM, *S. Buckman*. Pl. XX, figs. 9, 10. Suppl., Fig. 161, p. clxvii.

1889. PSEUDOLIOCERAS BEYRICHI, *This Monogr.*, Pl. xx, figs. 9, 10; p. 87 (pars).

1902. — REPLICATUM, *Emend. Amm. Nom.*, p. 5.

Description.—Gradumbilicate, costatumbilicate, subcostate; and see p. 87.

Distinction.—From *P. Beyrichi*, the larger and costate umbilicus; the less definite costation; the whorl section.

Locality and Horizon.—Gloucestershire: North Nibley, Bed 6, Section vii, p. 46.

Date of Existence.—*Aalensis* hemera.

The two following species remain for record :

7. *DENCKMANNIA BREDONENSIS*, *S. Buckman*.

1903. *DENCKMANNIA BREDONENSIS*, Quart. Journ. Geol. Soc., vol. lix, Pl. xxvii, figs. 1—4, p. 459.

Locality and Stratum.—Worcestershire: Overbury, in a gravel pit, with derived Toarcian and other materials. Collection of Surgeon-Major Isaac Newton.

Date of Existence.—*Hemera Variabilis* (presumably). For allied species see pp. xvii—xxii.

2. *CHARTRONIA COSTIGERA*, *S. Buckman*.

1903. *CHARTRONIA COSTIGERA*, Quart. Journ. Geol. Soc., vol. lix, Pl. xxviii, figs. 1—4, p. 459.

Locality and Stratum.—Gloucestershire: Buckholt Wood, near Stroud, Cephalopod Bed (*Dispansum* bed). Collection of Mr. Charles Upton.

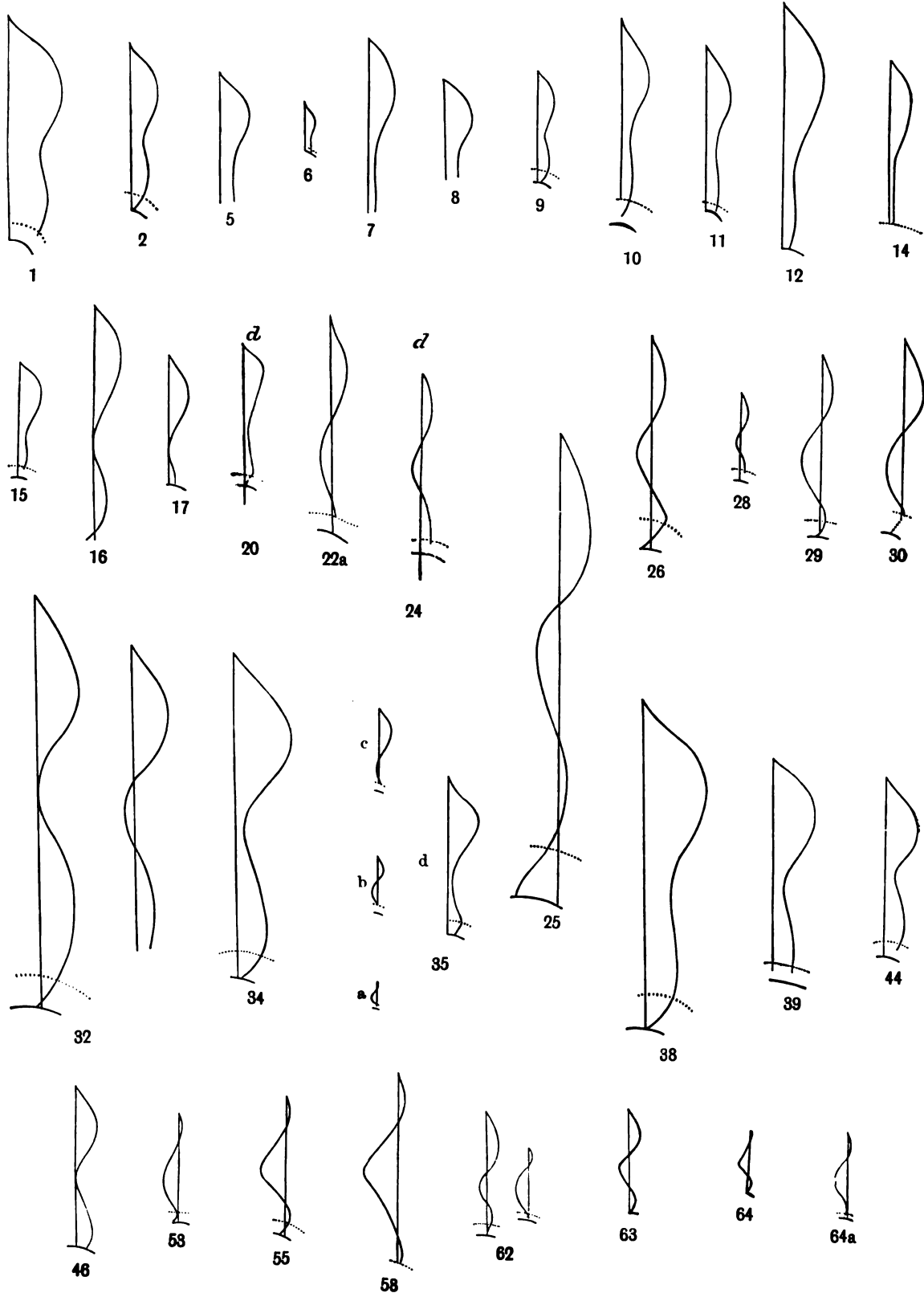
Date of Existence.—*Hemera Dispansi*. For allied species see p. xvi.

SUPPLEMENT, TABLE I.

- Fig. 1.—*Cypholloceras opaliniforme*, pp. xliii, xlv.
 Fig. 2.—*Lioceras opalinum*, pp. xxxv, xli.
 Fig. 5.—*Ancolloceras substriatum*, pp. xlvii, xlviii.
 Fig. 6.—*Asthenoceras nannodes*, p. xlix.
 Fig. 7.—*Cylioceras undatum*, pp. xlix, l.
 Fig. 8.—*Geyeria fasciata*, p. l.
 Fig. 9.—*Geyeria ? evertens*, p. l.
 Fig. 10.—*Welschia obtusifformis*, p. li.
 Fig. 11.—*Cosmogyrina obtusa*, p. lii.
 Fig. 12.—*Hyattia pustulifera*, p. lv.
 Fig. 14.—*Hyattina Brasili*, p. lvii.
 Fig. 15.—*Manselia subfalcata*, p. lviii.
 Fig. 16.—*Apedogyria patellaria*, p. lix.
 Fig. 17.—*Ludwigina patula*, p. lxi.
 Fig. 20 d.—*Strophogyria cosmia*, p. lxiii.
 Fig. 22 a.—*Kiliania laciniosa*, pp. lxiv, lxv.
 Fig. 24 d.—*Paquieria angulata*, p. lxvii.
 Fig. 25.—*Wiltshireia gigantea*, p. lxviii.
 Fig. 26.—*Ludwigia Murchisonæ*, p. lxix.
 Fig. 28.—*Rhæboceras tortum*, p. lxxii.
 Fig. 29.—*Crickia reflua*, p. lxxiii.
 Fig. 30.—*Lucya caduceifera*, pp. lxxiv, lxxv.
 Fig. 32.—*Lucya magna*, p. lxxvi. (Two radial lines.)
 Fig. 34.—*Depaoceras fallax*, pp. lxxvii, lxxviii.
 Fig. 35 a—d.—*Depaoceras fallax*, p. lxxviii. (Four radial lines showing development.)
 Fig. 38.—*Depaoceras formosum*, p. lxxix.
 Fig. 39.—*Brasilina bradfordensis*, p. lxxx.
 Fig. 44.—*Brasilina Tutcheri*, p. lxxxiii.
 Fig. 46.—*Ludwigella arcitenens*, pp. lxxxiv, lxxxv.
 Fig. 53.—*Pseudographoceras literatum*, p. xci.
 Fig. 55.—*Platygraphoceras apertum*, p. xciii.
 Fig. 58.—*Graphoceras v-scriptum*, pp. xcv, xcvi.
 Fig. 62.—*Braunsina contorta*, p. xcix. (Two radial lines showing development.)
 Fig. 63.—*Braunsina ? angulifera*, p. ci.
 Fig. 64.—*Braunsina ? futilis*, p. ci.
 Fig. 64 a.—*Braunsella semilenis*, p. cii.

SUPPLEMENT, TABLE I.

Radial lines.—HILDOCERATIDÆ.

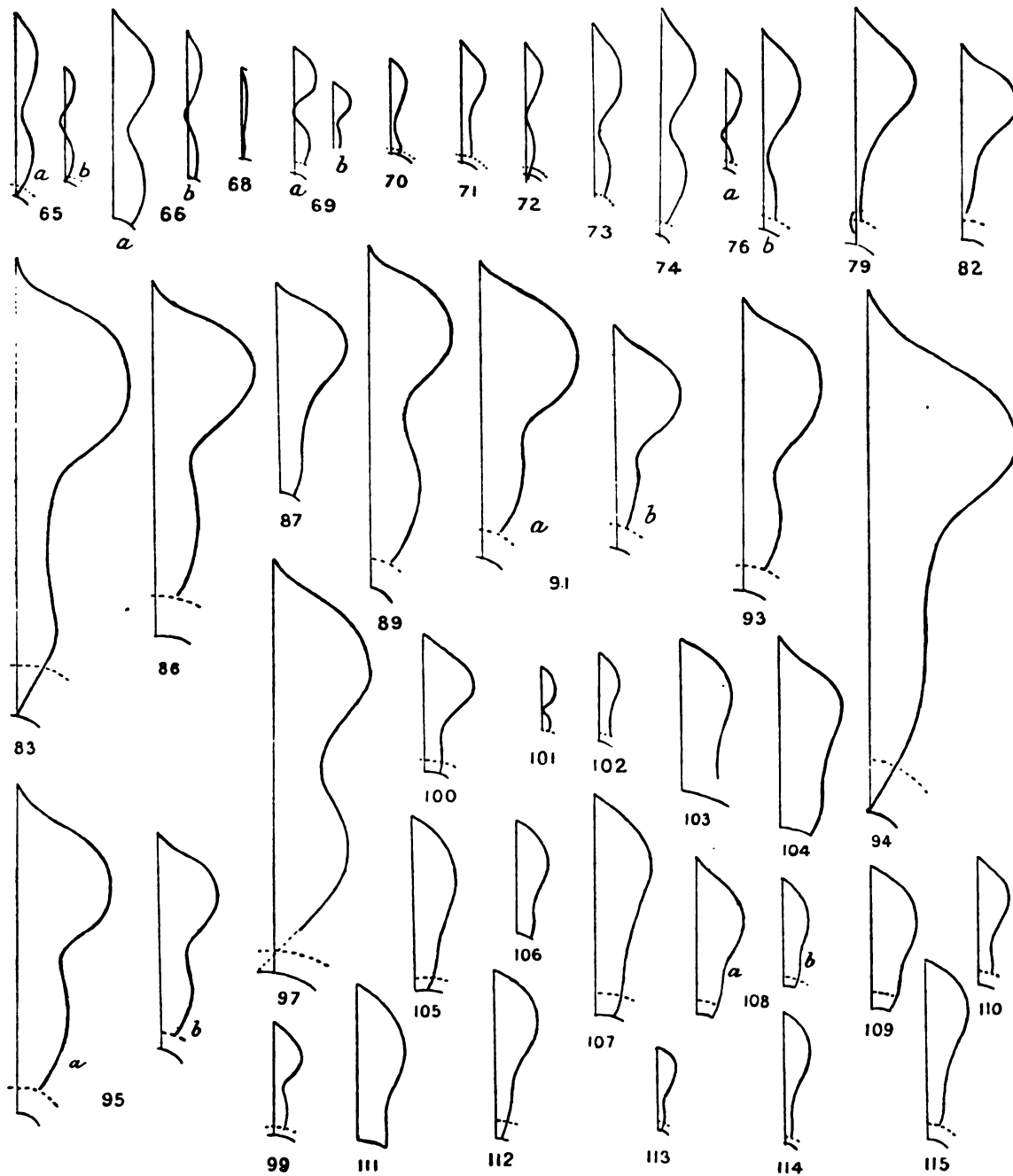


SUPPLEMENT, TABLE II.

- Fig. 65.—*Reynesia intermedia*, p. ciii. (Two radial lines showing development of rostration during ontogeny.)
- Fig. 66.—*Darellina planaris*, p. cvi. (Two radial lines showing rapid development of rostration.)
- Fig. 68.—*Darellella recticostata*, p. cvii.
- Fig. 69.—*Ædania falcigera*, pp. cvii, cviii. (Two radial lines showing change from falcate to biarcuate.)
- Fig. 70.—*Reynesella juncta*, p. cix.
- Fig. 71.—*Hugia curva*, p. cxi.
- Fig. 72.—*Lopadoceras arcuatum*, pp. cxi, cxii.
- Fig. 73.—*Darellia semicostata*, p. cxiii.
- Fig. 74.—*Darellia lævis*, p. cxiii.
- Fig. 76.—*Dissoroceras tabulatum*, p. cxv. (Two radial lines.)
- Fig. 79.—*Deltoidoceras astrictum*, pp. cxvii, cxviii.
- Fig. 82.—*Deltoidoceras subdiscoideum*, p. cxviii. (From specimen figured Pl. XIX, figs. 5, 6.)
- Fig. 83.—*Deltoceras cuneatum*, p. cxix.
- Fig. 86.—*Deltoceras subsectum*, p. cxxi.
- Fig. 87.—*Hyperlioceras discites*, pp. cxxi, cxxii.
- Fig. 89.—*Hyperlioceras Desori*, p. cxxii.
- Fig. 91.—*Hyperlioceras Lucyi*, p. cxxiii. (Radial lines at two stages in the same specimen.)
- Fig. 93.—*Hyperlioceras sublere*, p. cxxiii.
- Fig. 94.—*Hyperlioceras rudidiscites*, p. cxxiv.
- Fig. 95.—*Hyperlioceras liodiscites*, p. cxxv. (Two radial lines.)
- Fig. 97.—*Tozolioceras Walkeri*, p. cxxvi.
- Fig. 99.—*Stokeia marmorea*, pp. cxxvii, cxxviii.
- Fig. 100.—*Canavarella belophora*, pp. cxxviii, cxxix.
- Fig. 101.—*Canavarella ? arenacea*, p. cxxix.
- Fig. 102.—*Cypholioceras plicatum ?* p. cxxx. (From specimen figured Pl. XIV, figs. 5, 6.)
- Fig. 103.—*Grammoceras striatulum*, pp. cxxxi, cxxxiii.
- Fig. 104.—*Grammoceras audax*, p. cxxxii.
- Fig. 105.—*Cotteswoldia paucicostata*, p. cxxxiii.
- Fig. 106.—*Cotteswoldia limatula*, p. cxxxiv.
- Fig. 107.—*Cotteswoldia superba*, p. cxxxiv.
- Fig. 108.—*Cotteswoldia subcandida*, p. cxxxv. (Two radial lines.)
- Fig. 109.—*Cotteswoldia misera*, p. cxxxv.
- Fig. 110.—*Cotteswoldia*, sp., p. cxxxv.
- Fig. 111.—*Cotteswoldia crinita*, p. cxxxvii.
- Figs. 112, 113.—*Pleydellia aalensis*, p. cxxxvii. (Fig. 112 from specimen figured Pl. XXXII, figs. 4—6; Fig. 113 from specimen figured Pl. XXXII, fig. 3.)
- Fig. 114.—*Pleydellia fluens*, p. cxxxvii.
- Fig. 115.—*Pleydellia leura*, p. cxxxviii. (From specimen figured Pl. XXXIII, figs. 8—10.)

SUPPLEMENT, TABLE II.

Radial lines.—HILDOCRATIDÆ.



SUPPLEMENT, TABLE III.

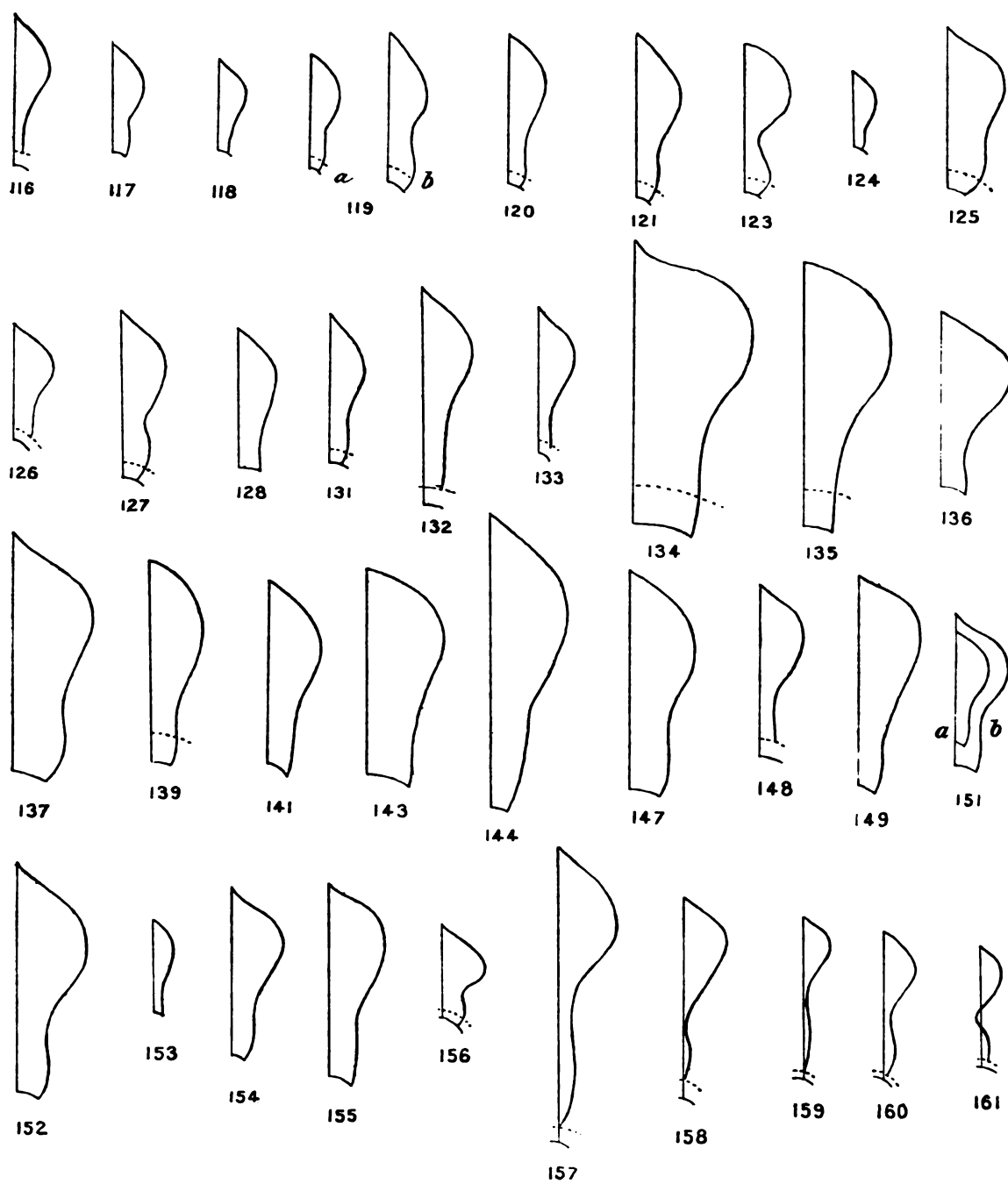
- Fig. 116.—*Pleydellia leura*, p. cxxxviii. (From specimen figured Pl. XXXIII, figs. 5—7.)
 Fig. 117.—*Pleydellia? subcompta?* p. cxxxviii.
 Fig. 118.—*Pleydellia*, sp. A., p. cxxxviii.
 Fig. 119.—*Pleydellia? mactra?* p. cxxxix.
 Fig. 120.—*Pleydellia*, sp. B., p. cxxxix.
 Fig. 121.—*Walkeria arcuata*, p. cxxxix.
 Fig. 123.—*Walkeria? lotharingica?* p. cxl.
 Fig. 124.—*Walkeria?* sp., p. cxl.
 Figs. 125, 126.—*Walkeria? subglabra*, p. cxli. (Fig. 125 from specimen figured Pl. XIII, figs. 7, 8; Fig. 126 from specimen figured Pl. XIII, figs. 9, 10.)
 Fig. 127.—*Canavarina digna*, p. cxli.
 Fig. 128.—*Canavarina folleata*, p. cxli.
 Figs. 131, 132.—*Canavarina venustula*, p. cxliii. (Fig. 131 from specimen figured Pl. XXXI, figs. 10, 11; Fig. 132 from specimen figured Pl. XXX, figs. 5, 6.)
 Fig. 133.—*Canavarina?* sp., p. cxliii.
 Fig. 134.—*Pseudogrammoceras regale*, pp. cxliii, cxlv.
 Fig. 135.—**Pseudogrammoceras subquadratum*, p. cxlv.
 Fig. 136.—**Pseudogrammoceras thrasu*, p. cxlv.
 Fig. 137.—**Pseudogrammoceras Bingmanni*, p. cxlv.
 Fig. 139.—**Pseudogrammoceras explicatum*, p. cxlvi.
 Fig. 141.—**Pseudogrammoceras subfallaciosum*, p. cxlvii.
 Fig. 143.—**Pseudogrammoceras Struckmanni*, p. cxlviii.
 Fig. 144.—**Pseudogrammoceras Cotteswoldiæ*, p. cxlix.
 Fig. 147.—**Pseudogrammoceras pachu*, p. cli.
 Figs. 148, 149.—**Pseudogrammoceras Muelleri*, p. cli. (Fig. 148 from specimen figured Pl. XXXIV, figs. 8, 9; Fig. 149 from specimen figured Pl. XXXV, figs. 1—3.)
 Fig. 151.—*Pseudogrammoceras? doerntense*, p. cliii. (a from specimen figured Pl. XXIX, figs. 4, 5; b from Pl. XXIX, figs. 1, 2.)
 Fig. 152.—*Pseudogrammoceras? placidum*, p. cliii.
 Fig. 153.—*Pseudogrammoceras?* sp., p. cliv.
 Fig. 154.—*Phlyseogrammoceras mettalarium*, pp. cliv, clv.
 Fig. 155.—*Phlyseogrammoceras Orbignyi*, p. clv. (From specimen figured Pl. XXVII, figs. 5, 6.)
 Fig. 156.—*Vacekia Stephensi*, pp. clvi, clvii.
 Fig. 157.—*Polyplectus discoides*, p. clvii. (From a specimen in my collection.)
 Fig. 158.—**Pseudolioceras lythense*, Young and Bird. (From a specimen in my collection, from Whitby.¹)
 Fig. 159.—*Pseudolioceras gradatum*, p. clviii.
 Fig. 160.—*Pseudolioceras Beyrichi*, p. clx.
 Fig. 161.—*Pseudolioceras replicatum*, p. clx.

* Without carina, therefore the peripheral projection appears slightly less.

¹ By an oversight on my part the radial line has been taken from *P. lythense* instead of from the genotype *P. compactile*.

SUPPLEMENT, TABLE III.

Radial lines.—HILDOCERATIDÆ.



SUPPLEMENT, PLATE XV.

Murchisonæ hemera.

Figs. 1—3.—KILIANIA ? TUBERATA, *S. Buckman*.

Fig. 1.—Side view of a specimen without test. From the Pea Grit series of the Andoversford neighbourhood, probably from Brockhampton, Gloucestershire. (Page lxvi.)

Fig. 2.—Front view.

Fig. 3.—Suture-lines. 3 *a*. Radial-line.

Figs. 4—6.—KILIANIA LACINIOSA, *S. Buckman*.

Fig. 4.—Side view of a specimen with test. "Wild Bed," Chideock Quarry Hill, Dorset. (Page lxv.)

Fig. 5.—Front view.

Fig. 6.—Suture-lines. 6 *a, b*. Radial-lines.

Bradfordensis hemera.

Figs. 7, 8.—WILTSHIREIA GIGANTEA, *S. Buckman*.

Fig. 7.—Side view of an immature specimen. From the "Building Stone," Stoke Knap, near Broad Windsor, Dorset. (Page lxviii.)

Fig. 8.—Suture-line. 8 *a*. Radial-line.

(See Suppl. Pl. XI, fig. 31 ; also Pl. XI, fig. 1, 1888.)

Concavi hemera.

Figs. 9—11.—GRAPHOCERAS ROBUSTUM, *S. Buckman*.

Fig. 9.—Side view. "Fossil Bed," Bradford Abbas, Dorset. (Page xcv.)

Fig. 10.—Front view.

Fig. 11.—Radial-line.

Figs. 12—14.—GRAPHOCERAS MIRABILE, *S. Buckman*.

Fig. 12.—Side view. "Fossil Bed," Bradford Abbas, Dorset. Collected by Mr. Darell Stephens, F.G.S. (Page xcvi.)

Fig. 13.—Whorl-section.

Fig. 14.—Radial-lines.

Discitæ hemera.

Figs. 15—17.—GRAPHOCERAS ? INCLUSUM, *S. Buckman*.

Fig. 15.—Side view. "Fossil Bed," Bradford Abbas. (Page xcvi.)

Fig. 16.—Whorl-section.

Fig. 17.—Radial-line.

Figs. 18—23.—Radial-lines.

Fig. 18.—*Graphoceras v-scriptum*, Pl. X, figs. 5, 6. (Page xcvi.)

Fig. 19.—*Graphoceras ? decorum*, Pl. VIII, figs. 3, 4. (At two periods.) (Page xcvi.)

Fig. 20.—*Lucya ? cavata*, Pl. IX, figs. 1, 2. (At two periods.) (Page lxxvi.)

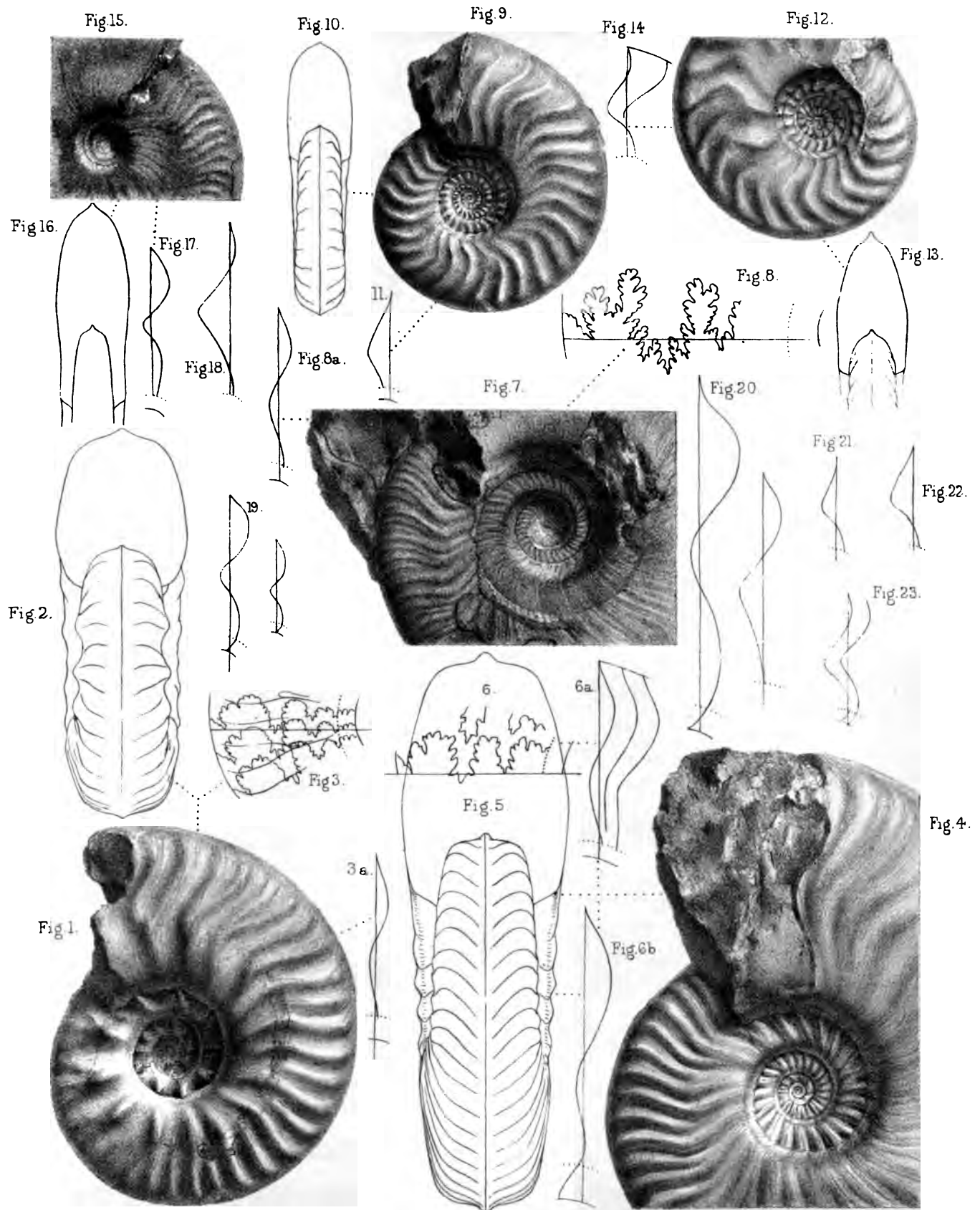
Fig. 21.—*Pseudographoceras ? compressum*, Pl. XV, figs. 5, 6. (Page xciii.)

Fig. 22.—*Graphoceras limitatum*, Pl. X, figs. 7, 8. (Page xcvi.)

Fig. 23.—*Platygraphoceras apertum*, Pl. X, figs. 10, 11. (Page xciv.)

The references denote the specimens from which the radial-lines have been taken.

All the specimens are in my Collection.



SUPPLEMENT, PLATE XVI.

Discitæ hemera.

Figs. 1—3.—*DEPAOCERAS FALLAX*, *S. Buckman.*

Fig. 1.—Side view. “Fossil Bed,” Bradford Abbas, Dorset. (Page lxxviii.)

Fig. 2.—Front view.

Fig. 3.—Suture-line. 3 *a.* Radial-line.

(See Pl. XIV, figs. 10, 11, “*Lioceras fallax*.”)

Figs. 4—6.—*HYPERLIOCERAS CURVICOSTATUM*, *S. Buckman.*

Fig. 4.—Side view of a wholly septate specimen almost without test. Bradford Abbas, “Fossil Bed.” Collection of Mr. D. Stephens, F.G.S. (Page cxxiv.)

Fig. 5.—Front view. The carina is not drawn conspicuous enough.

Fig. 6.—Suture-lines. 6 *a.* Radial-line.

Figs. 7—9.—*DELTOTOCERAS CUNEATUM*, *S. Buckman.*

Fig. 7.—Side view. Bradford Abbas, “Fossil Bed.” Collection of Mr. D. Stephens. (Page cxix.)

Fig. 8.—Whorl-sections. 8 *a.* Section of the septicarina.

Fig. 9.—Suture-lines. 9 *a.* Radial-line.

SUPPLEMENT, PLATE XVII.

Discitæ hemera.

Figs. 1—3.—*REYNESELLA ? RODBURGENSIS*, *S. Buckman.*

- Fig. 1.—Side view. Rodborough Hill, near Stroud; Lower *Trigonia*-grit. (Page cx.)
Fig. 2.—Front view.
Fig. 3.—Radial curve. 3 *a.* Outline of the lateral mouth-border.

Figs. 4—6.—*REYNESELLA JUNCTA*, *S. Buckman.*

- Fig. 4.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens. (Page cix.)
Fig. 5.—Front view.
Fig. 6.—Radial curve.

Figs. 7—9.—*BRAUNSELLA ? ROTABILIS*, *S. Buckman.*

- Fig. 7.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens. (Page cii.)
Fig. 8.—Front view.
Fig. 9.—Radial curve.

Figs. 10—12.—*DARELLELLA RECTICOSTATA*, *S. Buckman.*

- Fig. 10.—Side view. Bradford Abbas, "Fossil Bed." From my father's Collection. (Page cvii.)
Fig. 11.—Front view.
Fig. 12.—Radial curve. 12 *a.* Outline of lateral mouth-border. 12 *b.* Suture-line from another example.

Figs. 13—15.—*BRAUNSINA ASPERA*, *S. Buckman.*

- Fig. 13.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens. (Page xcix.)
Fig. 14.—Front view.
Fig. 15.—Radial curves. 15 *a.* Outline of lateral part of aperture.

Figs. 16—18.—*BRAUNSINA CONTORTA*, *S. Buckman.*

- Fig. 16.—Side view. Bradford Abbas, "Fossil Bed." (Page xcix.)
Fig. 17.—Front view.
Figs. 18, 18 *a.*—Radial curves.

Figs. 19—21.—*BRAUNSELLA SEMILENIS*, *S. Buckman.*

- Fig. 19.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens. (Page cii.)
Fig. 20.—Front view.
Fig. 21.—Radial curve.

Figs. 22—24.—*DARELLINA PLANARIS*, *S. Buckman.*

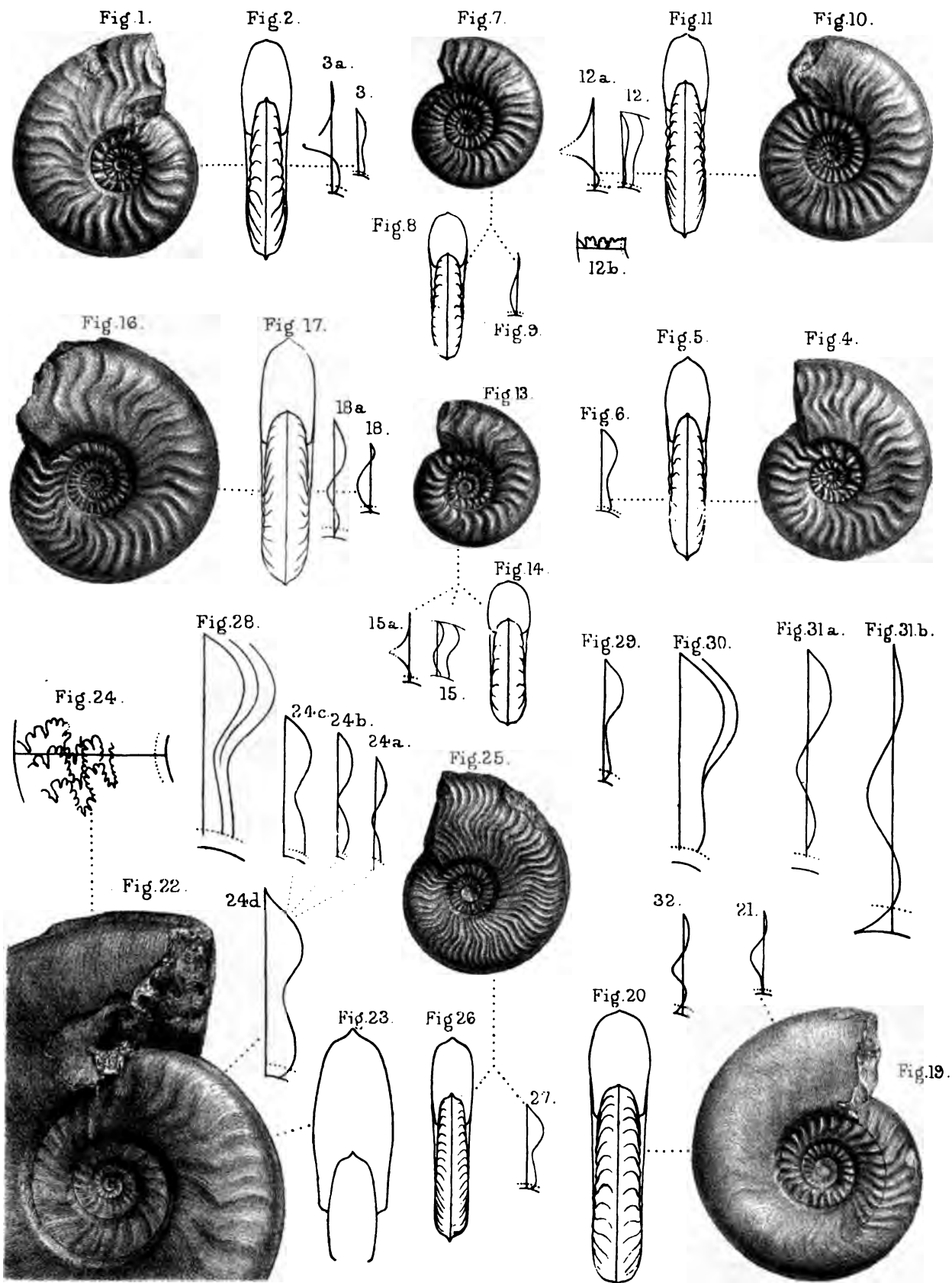
- Fig. 22.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens. (Page cvi.) Type; and see Suppl., Pl. XXII, figs. 7—9.
Fig. 23.—Whorl-section.
Fig. 24.—Suture-lines. 24 *a—d.* Radial lines at different periods.

Figs. 25—27.—*REYNESELLA ? LINEATA*, *S. Buckman.*

- Fig. 25.—Side view. Bradford Abbas, "Fossil Bed." (Page cx.)
Fig. 26.—Front view.
Fig. 27.—Radial curve.

Figs. 28—32.—RADIAL CURVES.

- Fig. 28.—*Brasilia bradfordensis*, Pl. IV, fig. 5. (Page lxxv.)
Fig. 29.—*Hyattina* sp., Pl. IV, fig. 7. (Page cxxx.)
Fig. 30.—*Ancolioceras ? costatum*, Pl. VII, fig. 7. (Page xlviii.)
Fig. 31.—*Ludwigia ambigua*, Pl. VII, figs. 1, 2. (Page lxxii.)
Fig. 32.—*Braunsella lenis*, Pl. VII, figs. 5, 6. (Page cii.)



100

SUPPLEMENT, PLATE XVIII.

Discitæ hemera.

Figs. 1—3.—*TOXOLIOCERAS WALKERI*, *S. Buckman.*

Fig. 1.—Side view. Bradford Abbas, "Fossil Bed." (Page cxxvi.)

(See Fig. 22, and also Pl. XVI, figs. 1, 2, "*Hyperlioceras Walkeri*.")

Fig. 2.—Whorl-section.

Fig. 3.—Radial curve.

Figs. 4—6.—*TOXOLIOCERAS MUNDUM*, *S. Buckman.*

Fig. 4.—Side view. Bradford Abbas, "Fossil Bed." My father's Collection. (Page cxxvi.)

Fig. 5.—Front view.

Fig. 6.—Radial curve.

Figs. 7—9.—*HYPERLIOCERAS DISCITIFORME*, *S. Buckman.*

Fig. 7.—Side view. Bradford Abbas, "Fossil Bed." Collection of Mr. Darell Stephens, F.G.S. (Page cxxiv.)

Fig. 8.—Whorl-section.

Fig. 9.—Radial curve.

Figs. 10—12.—*STOKEIA SUBACUTA*, *S. Buckman.*

Fig. 10.—Side view (portion). Locality not recorded. Matrix like Halfway House (near Sherborne, Dorset) "Blue Beds." My father's Collection. (Page cxxviii.)

Fig. 11.—Whorl-section.

Fig. 12.—Radial curve.

Figs. 13—15.—*DARELLIA TOXERES*, *S. Buckman.*

Fig. 13.—Side view. Stoke Knap (Dorset), "Building Stone." (Page cxiii.)

Fig. 14.—Front view (outline).

Fig. 15.—Radial curve.

Figs. 16—18.—*DARELLIA CONCINNA*, *S. Buckman.*

Fig. 16.—Side view (portion). Locality not recorded, presumably Bradford Abbas, "Fossil Bed." My father's collection. (Page cxiv.)

Fig. 17.—Whorl-section.

Fig. 18.—Radial curve.

Figs. 19—21.—*HUGIA CURVA*, *S. Buckman.*

Fig. 19.—Side view. Bradford Abbas, "Fossil Bed." (Page cxi.)

Fig. 20.—Front view (outline).

Fig. 21.—Suture-line. 21 a. Radial curves.

Figs. 22—31.—*RADIAL CURVES.*

Fig. 22.—*Toxolioceras Walkeri*, Pl. XVI, figs. 1, 2. (Page cxxvi.)

Fig. 23.—*Hyperlioceras discitiforme*, Pl. XVI, figs. 12, 13. (Page cxxiv.)

Fig. 24.—*Reynesella piodes*, Pl. XVI, figs. 7, 8. (Page cix.)

Fig. 25.—*Reynesella piodes*, Pl. XVI, fig. 9. (Page cix.)

Fig. 26.—*Reynesia cæla*, Pl. XVI, figs. 10, 11. (Page civ.)

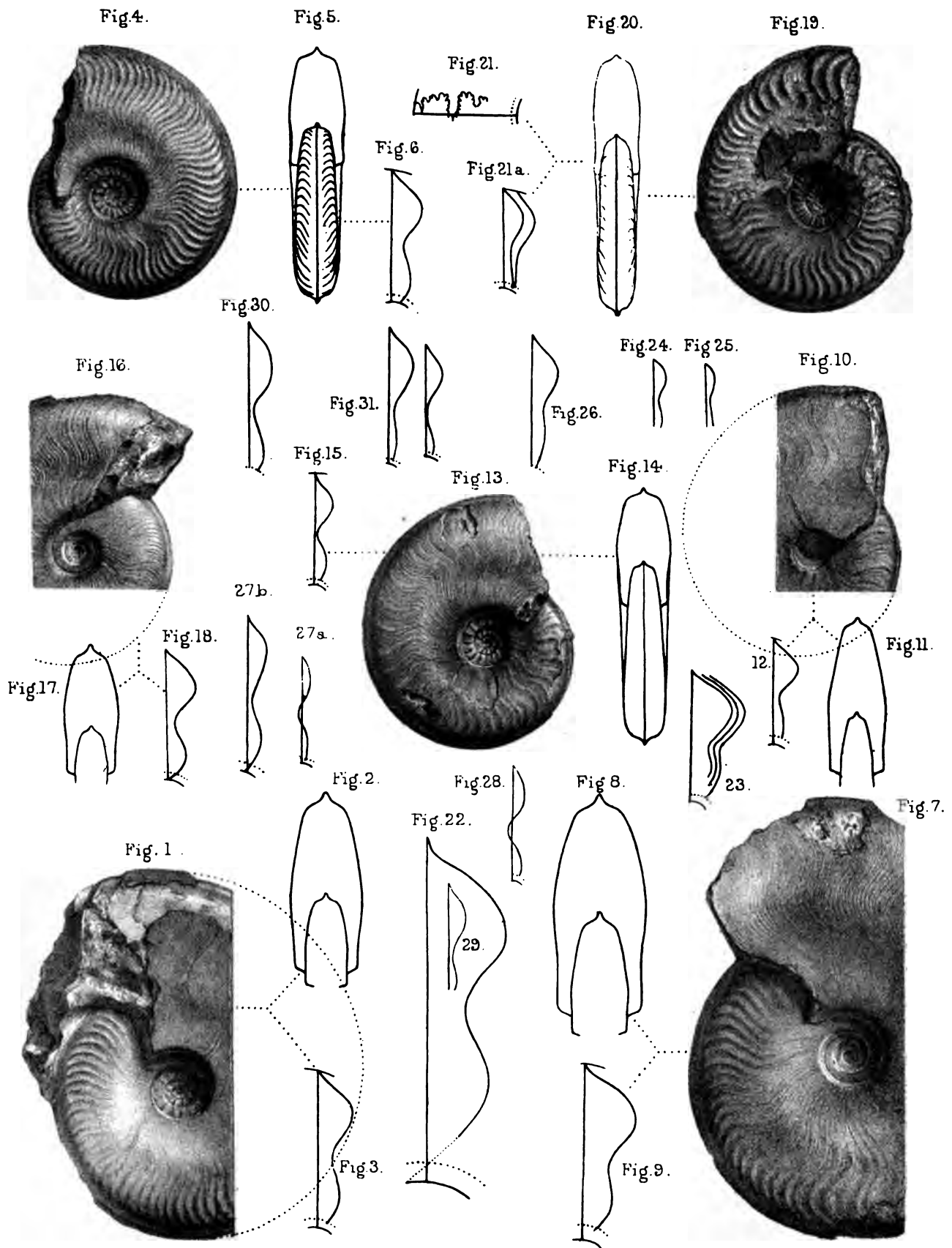
Fig. 27.—*Reynesia intermedia*, Pl. XI, figs. 2, 3. (Page ciii.)

Fig. 28.—*Reynesia laza*, Pl. XI, figs. 6, 7. Drawn with curves rather too pronounced. (Page ciii.)

Fig. 29.—*Reynesia lepida*, Pl. XI, figs. 4, 5. (Page civ.)

Fig. 30.—*Darellia semicostata*, Pl. XII, figs. 10, 11. (Page cxiii.)

Fig. 31.—*Darellia? polita*, Pl. XVI, figs. 3, 4. (Page cxiv.)



SUPPLEMENT, PLATE XIX.

Discitæ hemera.

Figs. 1—3.—*BRAUNSINA ELEGANTULA*, *S. Buckman*.
Bradford Abbas (Dorset), "Fossil Bed." (Page c.)

Figs. 4—6.—*LUDWIGELLA SUBOBSOLETA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page lxxxviii.)

Concavi hemera.

Figs. 7—9.—*LUDWIGELLA MICRA*, *S. Buckman*.
Louse Hill, near Halfway House (Dorset). (Page lxxxix.)

Figs. 10—12.—*LUDWIGELLA ATTENUATA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page lxxxvii.)

Figs. 13—15.—*LUDWIGELLA VIBRATA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page lxxxviii.)

Figs. 16—18.—*LUDWIGELLA CALLOSA*, *S. Buckman*.
Sandford Lane, Sherborne. (Page lxxxviii.)

Date uncertain.

Figs. 19—21.—*LUDWIGELLA OPACA*, *S. Buckman*.
Locality uncertain. From my father's Collection. (Page xc.)

Bradfordensis hemera.

Figs. 22—24.—*LUDWIGELLA BLANDA*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page lxxxvii.)

Figs. 25—27.—*LUDWIGELLA IMPOLITA*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page lxxxv.)

Figs. 28—30.—*LUDWIGELLA FLEXILIS*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page lxxxviii.)

Figs. 31—33.—*LUDWIGELLA ATTRACTA*, *S. Buckman*.
Louse Hill, near Halfway House (Dorset). (Page lxxxvii.)

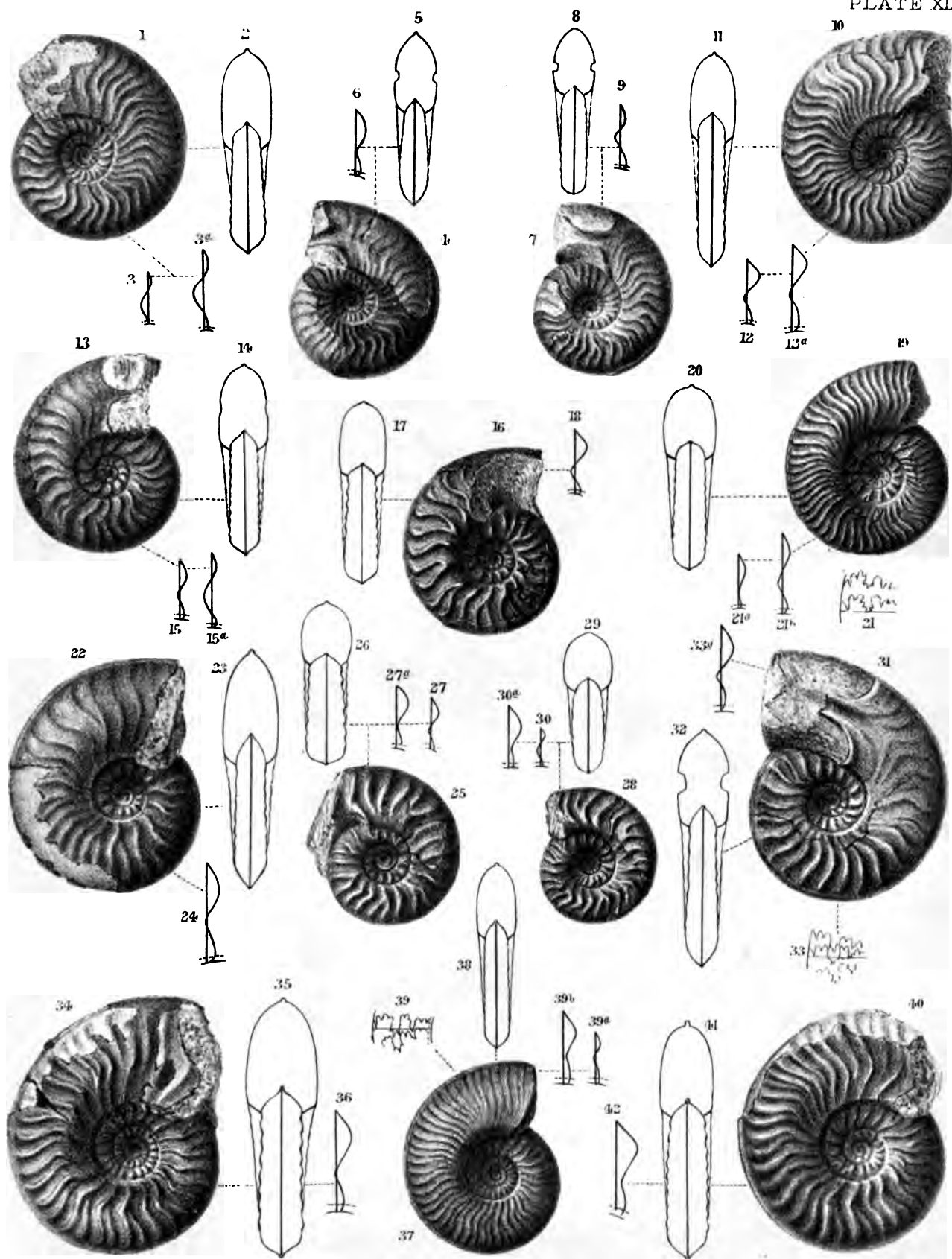
Figs. 34—36.—*LUDWIGELLA NODATA*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page xc.)

Discitæ hemera.

Figs. 37—39.—*LUDWIGELLA MODICA*, *S. Buckman*.
Locality unrecorded, but evidently Bradford Abbas, "Fossil Bed." From
my father's Collection. (Page xci.)

Bradfordensis hemera.

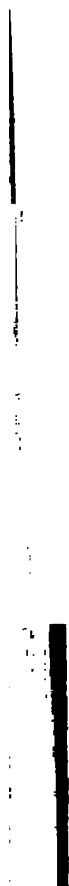
Figs. 40—42.—*LUDWIGELLA CARINATA*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page xc.)





1

1



PRINTED BY ADLARD AND SON, LONDON AND DORKING.

II. REVISION OF, AND ADDITIONS TO, THE POLYMORPHIDÆ.

Family—POLYMORPHIDÆ, *Haug*.1891. POLYMORPHIDÆ, This Monogr., pp. 231, *et seq.*

The principal character which distinguishes the members of this family from the Hildoceratidæ is the suture line, with its inner lobes pointing obliquely across the whorl towards the periphery. There are cases, however, in which this character fails—for example, in degenerate species of *Dumortieria*, and in the genera *Catulloceras* and *Tmetoceras*. In style of ribbing most of the members of this family may be distinguished from the Hildoceratidæ—the ribs run straight, or nearly straight, across the whorl, having little of that lateral bend which is often so conspicuous in the Hildoceratidæ, and little of the ventral projection (rostration) which is sometimes so marked in that family.

The manner of phyletic development, however, is the chief point to be noticed. Whereas the Hildoceratidæ attain to a marked tuberculate stage with a well-developed carina—*e. g.* *Lillia*, *Haugia*, *Denckmannia*, *Chartronia*, *Kiliana*, etc.—and then show the stages of decline through a costate to a smooth stage, the Polymorphidæ only attain to a parvituberculate stage when the carina has not been developed, or is only feeble; examples, *Tmetoceras*, no carina, sulcate periphery; *Uptonia*, costate periphery; *Acanthopleuroceras* (*Cycloceras*), feeble carina; while in *Dumortieria* and *Catulloceras* there is no evidence of a tuberculate stage having been attained: it seems as if the anagenetic costate stage passed direct into the catagenetic, and the carina is a feature developed in the catagenetic costate stage. But in the Hildoceratidæ, on the evidence of ontogeny and analogy with the Arietidæ, the carina is developed even before the anagenetic costate stage commences.

When the members of this family were described in the body of the work, only a few localities were known to yield the principal genera—*Dumortieria* and *Catulloceras*; and the examples were mostly poor. Much addition has been made since. Mr. Charles Upton found in Penn Wood, near Stroud, a rich fauna of *Dumortieria*. This locality, and Buckholt Wood, near Frocester, have yielded to him and to myself many good specimens. Dursley also afforded me a good series in nice condition—mostly from the *Moorei* beds. The late Mr. E. Wilson, F.G.S., and Dr. Vaughan, F.G.S., have sent me various species from the neighbourhood of Bath and Bristol. Mr. Bloomfield showed me two localities in the Yeovil Sands, just out of Yeovil, rich in *Dumortieria* and *Catulloceras*—mostly of a type distinct

from those of the Cotteswolds: they are apparently earlier biogenetically, if not geologically. Of course all this additional material has yielded many new forms; but only a few of the more conspicuous and important of them can be dealt with now.

I. Genus—*TMETOCERAS*, *S. Buckman*.

1892. *TMETOCERAS*, This Monogr., p. 269.

Remarks.—Species of this easily recognised genus mark, with one exception, a well-known horizon—the strata of the *scissi* hemera—from the Dorset coast to Northamptonshire. The exception is *Tm. Hollandæ*, the date of which is *Murchisonæ* hemera.

At Burton Bradstock and Chideock Quarry Hill, on the Dorset coast, species of *Tmetoceras* are found in the stratum capping the “Sands”—the bed with *Liocerata* (see p. xxxv).

In Gloucestershire, in the Cotteswolds around Stroud, at Robinswood Hill (Mr. L. Richardson), at Andoversford, species of the genus have been found in the “Sandy Ferruginous Beds.”

The “Northampton Sands” of Northamptonshire have yielded specimens which I have verified: they are doubtless the *Am. niortensis* mentioned by Sharpe.

The Paving Bed of Bradford Abbas (date *Murchisonæ* η) has yielded two species: one, *Tm. Hollandæ*, is indigenous; the other, aff. *Tm. circulare*, is derived presumably—the matrix in the whorls differs from that enclosing the specimen.

There are specimens in my cabinet from Italy and Normandy, and the genus has been found in South America (Gottsche).

1. *TMETOCERAS CIRCULARE*, *S. Buckman*. Plate XLVIII, figs. 1—3.

1892. *TMETOCERAS SCISSUM*, This Monogr., Pl. xlviii, figs. 1—3; p. 273 (pars).

Description.—Substeno- (on the line, 50 per cent.) subpachygyral; perlatum-bilicate; costate; periphery sulcate, the sulcus interrupting the costæ, of which each one terminates in a tubercle on the edge of the sulcus.

Distinction.—Very like *A. scissus*, Benecke, in proportions and appearance, but the whorl is rounder, and more inflated.

2. *TMETOCERAS SCISSUM* (*Benecke*). Plate XLVIII, figs. 4—7.

1892. *TMETOCERAS SCISSUM*, This Monogr., Pl. xlviii, figs. 4—7; p. 273 (pars).

3. *TMETOCERAS REGLEYI* (*Thiollière*). Plate XLVIII, figs. 8—10.

1892. *TMETOCERAS SCISSUM*, This Monogr., Pl. xlviii, figs. 8—10; p. 273 (pars).

Note.—Place here the reference to Dumortier, and with a query that to Gottsche.

Remarks.—The stout whorls, and general characters show close agreement with Dumortier's delineation. These features separate this form from the others.

Localities and Strata.—Dorset: Broad Windsor. Gloucestershire: Penn Wood, near Stroud, top of Sandy Ferruginous Beds. Foreign: Normandy; Feuguerolles, "Murchisonæ," from Dr. L. Brasil.

Date of Existence.—For the Penn Wood specimen, *scissi* hemera; and this is probably the correct date for the other examples—the strata of the *scissi* hemera having been often reckoned as base of *Murchisonæ* zone.

II. *Genus*—CATULLOCERAS, *Gemmellaro*.

1892. *CATULLOCERAS*, This Monogr., p. 276.

1. *CATULLOCERAS LEESBERGI* (*Branco*). Plate XXXIX, figs. 10, 11.

1891. *CATULLOCERAS LEESBERGI*, This Monogr., Pl. xxxix, figs. 10, 11; 1892, p. 279.

Remarks.—A good specimen of this rare and distinct species was found by Dr. A. Vaughan, at the tunnel shaft, Sodbury, Gloucestershire. It is larger than the example figured. I desire to thank him for adding it to my collection.

Note.—The want of carina in the specimen figured is due partly to ill preservation.

2. *CATULLOCERAS PSAMMINUM*, *S. Buckman*. Plate XLI, figs. 7, 8.

1891. *DUMORTIERIA RADIANS*, This Monogr., Pl. xli, figs. 7, 8.

Description.—Subplaty-subleptogyral; latumbilicate; spissicostate; periphery convex, parccarinate.

Distinction.—From *Catull. Leesbergi*, fewer whorls and a smaller umbilicus.

From *Dumortieria radians*, stouter whorls, a flatter periphery, a less definite carina.

Remarks.—The absence of the paucicostate stage (the evidence is furnished by other specimens), which is so noticeable in *Dumortieria*, even when more degenerate than this species, and the association of spissicostation with quadrate whorls and an open umbilicus, suggest that the generic position is *Catulloceras*.

Localities and Stratum.—Dorset: neighbourhood of Bradford Abbas, Yeovil Sands. Somerset: Furzey Knaps, near Yeovil, in the same beds, associated with several new allied species.

In the following species the periphery shows more or less definite furrows beside the carina. Place here also *Ammonites Perroudi*, Dumortier et Fontannes, and *Catull. aratum*, S. Buckm.

3. CATULLOCERAS SUBARATUM, *Brasil*. Plate XXXIX, figs. 1, 2.

1891. DUMORTIERIA ARATA, This Monogr., Pl. xxxix, figs. 1, 2.

1892. CATULLOCERAS ARATUM, This Monogr., p. 280 (pars).

1895. CATULLOCERAS SUBARATUM, *Brasil*, Ceph. nouv., Bull. Soc. Géol. Normandie, vol. xvi, Pl. iv, figs. 1, 2.

Remarks.—Dr. L. Brasil has found this species in Normandy, and has rightly corrected me by separating this from the compressed form under a distinct name.

III. Genus—DUMORTIERIA, *Haug*.

1891. DUMORTIERIA, This Monogr., p. 231.

RECTIRADIATE.

Paucicostate.

1. DUMORTIERIA PRISCA, *S. Buckman*. Plate XXXVII, figs. 9—11.

1891. DUMORTIERIA PRISCA, This Monogr., Pl. xxxvii, figs. 9—11, p. 236.

Localities and Strata.—Somerset: Hendford Hill, Yeovil, in “the Sands.” Gloucestershire: Penn Wood, Cephalopoda Bed, middle (“*Dumortieria* Beds”). This specimen, 68 mm. in diameter, has last whorl sparsicostate to smooth, failure of costation beginning about 55 mm. in diameter.

Date of Existence.—*Dumortieria*.

position; Cam Down. Normandy: Tilly-sur-Seulles, two specimens in my collection from Mr. Brasil. He says (p. 7) it is abundant at Tilly-sur-Seulles and at Fontenay-le-Pesnel in the upper part of the zone of *Lytoceras jurense*, associated with species of *Dumortieria*, which he names; it occurs in England in similar association.

Date of Existence.—*Dumortieria* hemera.

3. *DUMORTIERIA FALCOFILA* (Quenstedt). Fig. 164 in text.

1885. *AMMONITES FALCOFILA*, Quenstedt, *Amm. Schwäb. Jura*, Pl. liv, fig. 31, and ? fig. 28.

Remarks.—Quenstedt figured a series of species as *A. falcofila*, *A. falcofila sparsicosta*, and *A. falcofila macer* (Plate LIV, figs. 28—35). Of these Fig. 31 agrees exactly with our English example, Fig. 28 is near, but may be a thinner form, Fig. 30 is a form allied to *Dumortieria pseudoradiosa* (v. p. 246); of Figs. 29, 35, *falcofila sparsicosta*, Fig. 29, is *D. novata*, sp. nov. (p. clxxiii), Fig. 35 is allied to *D. Munieri* (v. p. clxxv); of Figs. 32—34, *falcofila macer*, Figs. 32, 34, appear to be *Catullocceras* aff. *Dumortieri*, and might therefore be inscribed *Catullocceras macrum*; Fig. 33 is a smooth species upon which I venture no opinion.



FIG. 164.—*Dumortieria falcofila*, Quenstedt.

Distinction.—Shows little of the coarse distant ribbing characteristic of the early whorls of the two preceding species. Is stouter whorled than *D. novata*.

Localities and Strata.—Somerset: Furzey Knaps, near Yeovil, "Sands." Foreign; Normandy: Tilly-sur-Seulles, "Jurense zone," from Mr. L. Brasil.

Date of Existence.—*Dumortieria* hemera.

4. *DUMORTIERIA SUB SOLARIS*, S. Buckman. Pl. XXXVII, figs. 6—8.

1831. *AMMONITES SOLARIS*? Zieten, *Verst. Württ.*, Pl. xiv, fig. 7 (non *solaris*, Phillips).

1891. *DUMORTIERIA LEVESQUEI*, This Monogr., Pl. xxxvii, figs. 6—8.

1902. *DUMORTIERIA SOLARIS*, S. Buckman, *Emend. Amm. Nom.*, p. 6.

Distinction.—From *A. Levesquei*, d'Orbigny, costæ less definite, closer together, less persistent; whorl more compressed; periphery narrower, more acute.

Remarks.—Is *Am. solaris*, Zieten, but not Phillips ('*Geol. Yorkshire*,' Pl. IV,

fig. 29), which belongs to a different genus and a different family. As Zieten's name is a synonym, it cannot be used in the present case.

5. *DUMORTIERIA PAUCISEPTATA*, *S. Buckman*. Fig. 165 in text.

Description.—Subplatysubleptogyral; sublatumbilicate; pauciseptate, sublongi-subangustilobate; subpaucicostate to subcostate; periphery subfastigate, parvicarinate.

Distinction.—From young *D. novata*, the more compressed whorl, the narrower periphery, the less paucicostate character. From *D. sparsicosta*, more definitely costate; the septa more distant, their lobes larger.

Locality and Stratum.—Gloucestershire: Bowcott Wood, near Dursley, in the Cephalopod Bed.

Date of Existence.—*Moorei* hemera.



FIG. 165.—*Dumortieria pauciseptata*.

7. *DUMORTIERIA COSTULA* (*Reinecke*). Pl. XXXVII, figs. 12, 13, 18, 19; Suppl., Fig. 166, p. cxvi.

1818. *NAUTILUS COSTULA*, *Reinecke*, *Maris prot.*, figs. 33, 34.

1891. *DUMORTIERIA COSTULA*, *This Monogr.*, Pl. xxxvii, figs. 12, 13 only.

1891. *DUMORTIERIA*, sp., *Ibid*, Pl. xxxvii, figs. 18, 19.

Notes.—At a little larger size than that of the specimen figured in Pl. XXXVII, figs. 18, 19, the ribs degenerate rapidly, becoming close-set but sub-obsolete, somewhat after style of those in Plate XL, fig. 7.

Localities and Strata.—Gloucestershire: Cam Down, Buckholt Wood, Bowcott Wood, etc., Cephalopod Bed, upper part ("Moorei Beds"). Somerset: Stoford, Yeovil Sands.

Date of Existence.—*Moorei* hemera.

8. *DUMORTIERIA MUNIERI* (*Haug*). Plate XXXVII, figs. 14, 15. Suppl., Fig. 167.

1884. *HARPOCERAS MUNIERI*, *Haug*, *Nouv. Amm. du Lias sup.*, *Bull. Soc. Géol. France*, 3 Sér., vol. xii, Pl. xiii, fig. 3.

1885. *AMMONITES STRIATULOCOSTATUS*, *Quenstedt*, *Amm. Schwäb. Jura*, Pl. lii, fig. 8.

1891. *DUMORTIERIA COSTULA*, *This Monogr.*, Pl. xxxvii, figs. 14, 15.

Note.—The example which I have figured has great resemblance to Haug's type, both in general proportion and in manner of costation. It only differs in degree of costation, being more strongly ribbed, especially in the umbilical whorls.

9. *DUMORTIERIA* sp. Plate XLV, figs. 15, 16.

1891. *DUMORTIERIA LEVESQUEI*, This Monogr., p. 241, 1892, Pl. xlv, figs. 15, 16.

Remarks.—Not much can be said about this fragment. The umbilicus is not large enough for *A. Levesquei* (d'Orbigny). It seems to have some likeness to *D. Munieri*.

Paucicostate to Costate.

The inner whorls show more or less of the paucicostate or *D. prisca* stage, but the costate stage and decline of that stage are the chief characters in this series of species.

10. *DUMORTIERIA MULTICOSTATA*, *S. Buckman*. Suppl., Fig. 168 in text.

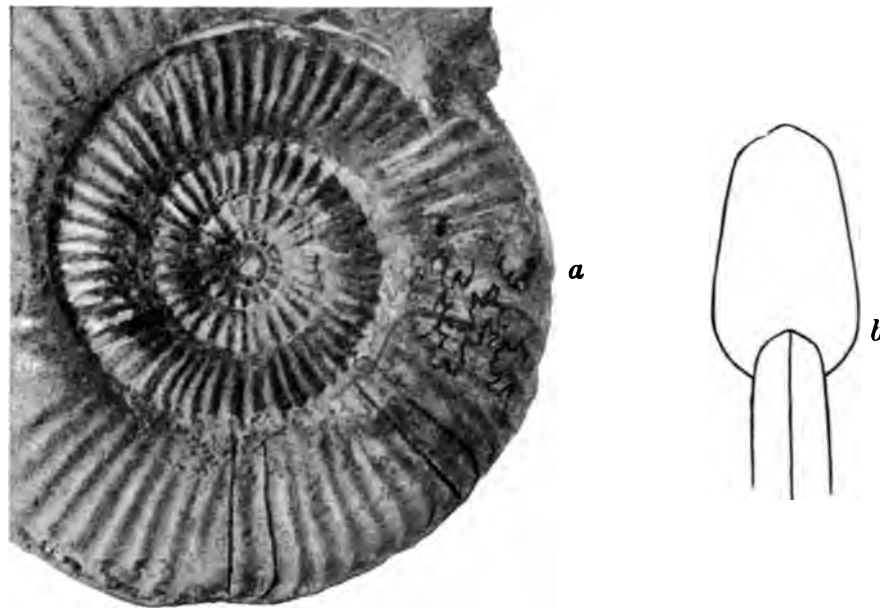


FIG. 168.—*Dumortieria multicostata*.

Description.—Subplatyleptogyral, lat-, almost perlatumbilicate, densiseptate; subbrevisubangustilobate; subpaucicostate to costate; periphery subtabulate, parvicarinate.

Remarks.—The *D. prisca* stage is evident in the inner whorls. The later development is much more definitely costate than in *D. novata*. Quenstedt figured

Distinction.—From *Dum. mutans*, costæ in umbilicus less coarse, and not declining so rapidly, a more distinct carina on a more definite periphery.

Localities and Stratum.—Gloucestershire: Penn Wood, Buckholt Wood, Cephalopod Bed, Middle (*Dumortieria* Beds). Largest specimen 113 mm. in diameter, with last half-whorl smooth.

14. *DUMORTIERIA YEOVILENSIS*, *S. Buckman*. Plate XXXVII, figs. 16, 17. Suppl., Fig. 172, p. cxcvi.

1891. *DUMORTIERIA STRIATULOCOSTATA*, This Monogr., Pl. xxxvii, figs. 16, 17.

1902. — *YEOVILENSIS*, Emend. Amm. Nom., p. 6.

Description.—Sublatumbilicate; costate changing to sublevigate; periphery fastigate, subcarinate.

Distinction.—More strongly costate and with a more acute periphery than either *D. mutans* or *D. declinans*.

Locality and Stratum.—Dorset-Somerset border, Yeovil Junction, Sands (Mr. D. Stephens). One specimen measures 114 mm. in diameter.

15. *DUMORTIERIA METITA*, *S. Buckman*. Plate XLII, figs. 11, 12. Suppl., Fig. 173, p. cxcvi.

1874. *AMMONITES RADIOSUS*, *Dumortier* (non *Seebach*), Pal. Bassin Rhone, vol. iv, Pl. xiv, fig. 2 only.

1891. *DUMORTIERIA RADIANUS*, This Monogr., Pl. xlii, figs. 11, 12.

1902. — *METITA*, Emend. Amm. Nom., p. 5.

Description.—Subplaty-subleptogyral; latumbilicate; subpauciparvicostate periphery convex to fastigate, parvicarinate.

Localities and Strata.—Gloucestershire: Cam Down, Penn Wood, Cephalopod Bed, middle part (*Dumortieria* Beds). Foreign: France, "Le Bernard (Vendée) Lias supérieur" (Mr. L. Chartron).

Date of Existence.—*Dumortieria hemera*.

16. *DUMORTIERIA REGULARIS*, *S. Buckman*. Plate XLI, figs. 4—6. Suppl., Fig. 174, p. cxcvi.

1890. *DUMORTIERIA RADIANUS*, This Monogr., Pl. xli, figs. 4—6.

Description.—Subplatysubleptogyral; latumbilicate; spissiparvicostate; periphery subtabulate, parvicarinate.

Distinction.—From *Dum. radians*, thinner whorls; more acute, less carinate periphery; finer smaller costæ.

Localities and Strata.—Gloucestershire: Cam Down, near Dursley, Cephalopod Bed, *Dumortieria* horizon. Foreign: France, Le Bernard (Vendée), Lias supérieur (submitted by Mr. Chartron).

Date of Existence.—*Dumortieria hemera*.

Costate to Striate.

The costate stage is sometimes omitted altogether.

20. *DUMORTIERIA DIPHYES*, *S. Buckman*. Plate XLIII, figs. 5, 6 (Type), fig. 7. Plate XLII, figs. 13, 14.

1891. *DUMORTIERIA RADIOSA*, This Monogr., Pl. xlii, figs. 13, 14; Pl. xliii, figs. 5—7.

Description.—Subplatyleptogyral, latumbilicate; costate declining to striate; periphery convexifastigate, parvicarinate.

Distinction.—From *Am. radiosus*, v. Seebach. Mr. E. Mascke, Assistant at Göttingen Museum, who is making a special study of Inferior Oolite Ammonites, has very kindly compared my figures with Seebach's original specimen, which is in that collection. He writes: "The identification of *Dumortieria radiosus* appears to me not to agree, for there is a whole series of differences."¹ He gives a table of comparative measurements which show that Seebach's shell has stouter whorls and a smaller umbilicus.

21. *DUMORTIERIA INCLUSA*, *S. Buckman*. Plate XLV, figs. 13, 14.

1891. *DUMORTIERIA RADIOSA*, var. *GUNDERSHOFENSIS*, This Monogr., p. 254 (pars); 1892, Pl. xlv, figs. 13, 14.

Description.—Platysubleptogyral; subangustumbilicate; spissicostate to striate to spissiparvicostate; periphery subtabulate, carinate.

Distinction.—From *D. radiosus*, var. *gundershofensis*, the umbilicus being costate and not showing the tendency to expand noticeable in Haug's figure.

22. *DUMORTIERIA* sp. Plate XLII, figs. 1, 2.

1891. *DUMORTIERIA RADIANUS*, This Monogr., Pl. xlii, figs. 1, 2.

¹ In litt., August 29th, 1902.

23. DUMORTIERIA PENEXIGUA, *S. Buckman*. Plate XLII, figs. 3—5.

1891. DUMORTIERIA RADIAN, This Monogr., Pl. xlii, figs. 3—5 only.

1902. „ „ PENEXIGUA, Emend. Amm. Nom., p. 5.

Description.—Subplatysubleptogyral; sublatumbilicate; striate; periphery sub-tabulate; subcarinate.

Distinction.—From *D. signata*, much finer ornament; slightly stouter whorls, broader, flatter periphery.

24. DUMORTIERIA EXTERNICOMPTA (*Branco*).

1879. HARPOCERAS SUBUNDULATUM, var. EXTERNE COMPTUM, *Branco*, Unt. Dogger, Abh. Geol. Spez. Karte Elsass-Lothringen, Bd. ii, Pl. iii, fig. 5 only.

Remarks.—This species has in the inner whorls rather coarse distant ribs, which change rapidly to fine striæ; these are slightly bunched towards the inner margin. The umbilicus is smaller and the whorl broader than in *D. diphyes*.

Localities and Stratum.—Gloucestershire: Bowcott Wood, Cephalopoda Bed, upper portion (*Moorei* Beds); Buckholt Wood.

Date of Existence.—*Moorei* hemera.

25. DUMORTIERIA SUBFASCIATA, *S. Buckman*. Plate XXX, fig. 18. Suppl., Fig. 177, p. cxcvi, and Fig. 178 in text.

1890. DUMORTIERIA RADIOSA, This Monogr., Pl. xxx, fig. 18.

1891. — — var. GUNDERSHOFFENSIS, p. 254 (pars).

Description.—Platysubleptogyral, sublatumbilicate, the umbilicus bordered by definite margin; striate, with tendency to more prominent distant striation at about 30 mm. diameter. Periphery convexi-fastigate, carinate.

Note.—The striæ are irregular along the inner edge of the whorl, as if gathered into small bunches. This character suggests the trivial name.

Distinction.—From *D. gundershoffensis*, Haug, thinner, more finely striate, with a less tabulate periphery.

Localities and Stratum.—Gloucestershire: Frocester Hill and Buckholt Wood, in the Cephalopod Bed.

Date of Existence.—*Moorei* hemera.



FIG. 178.—*Dumortieria subfasciata*.
Section of whorl.

26. *DUMORTIERIA MOOREI* (Lycett), Wright. Plate XLIV, fig. 9. Fig. 179 in text.

1857. *AMMONITES MOOREI*, Lycett, Cotteswold Hills, p. 122, description partly, and dimensions (Pl. i, fig. 2 a ?).

1883. *HARPOCERAS AALENSE*, Wright (non Zieten), Lias Amm. (Pal. Soc.), Pl. lxxx, figs. 1, 2.

Remarks.—The evidence about the type-specimen and Wright's figure is given in p. 255. One piece of evidence about the Jermyn Street example has been overlooked. Lycett in the explanation of his plate speaks of his figured example as a "small specimen." This is against the Jermyn Street fossil being the type. But

Lycett's figure looks like an adult specimen, reduced, and Wright says: "the large shell which . . . Dr. Lycett figured in his handbook" (p. 459).

Under the circumstances it is best to take Wright's figure as representing the type. That agrees so closely with the specimen referred to by Lycett as the largest example—of which he gives dimensions (p. 122); it is probably a figure of the same shell, which is most likely the Jermyn Street specimen, and that has always been considered as Lycett's type.

I have given a figure of another example here for two reasons—to illustrate the species better, and to emphasize the remarkable deceptions of homœomorphy. This figure



FIG. 179.—*Dumortieria Moorei*.¹

should be compared with that of *Cotteswoldia bifax*, p. cxxxvi, and the difference in the radial line noted. The two fossils are in the same stage of decline—from costate to striate—and show about the same amount of costate umbilicus; in fact, they are in every way most similar. Such differences as they present might be regarded as individual variation were it not for the differences in radial line, which differences they share with their respective allies.

This is a good example of the trouble in Ammonite identification.

27. *DUMORTIERIA SUBEXCENTRICA*, S. Buckman. Plate XXX, fig. 19, Plate XLIV, figs. 7, 8. Suppl., Fig. 180, p. cxcvi.

cf. 1851. *AMMONITES OPALINUS*, Bayle and Coquand (see p. 255).

1890. *DUMORTIERIA MOOREI*, This Monogr., Pl. xxx, fig. 19; 1891, Pl. xliv, figs. 7, 8, p. 255 (pars).

1902. — *SUBEXCENTRICA*, Emend. Amm. Nom., p. 6.

¹Two pieces of body-chamber, making another half-whorl, belong to this specimen, but *C. bifax* is complete.

Description.—Subexcentrumbilicate; striate (a small costate stage in inner whorls); periphery fastigate, parvicarinate.

Distinction.—From *D. Moorei*, the earlier loss of costæ and the peculiar umbilicus.

Remarks.—This species seems to have great likeness to the Chili fossil figured by Bayle and Coquand; but in face of what is known about homœomorphy it would be hazardous to suggest identity.

28. DUMORTIERIA LINEARIS, *S. Buckman*. Plate XXX, figs. 15—17. Suppl., Fig. 181, p. cxvii.

1890. DUMORTIERIA MOOREI, *This Monogr.*, Pl. xxx, figs. 15—17.

Description.—Subplatyleptogyral, sublatumbilicate, with definite inner margin; striate; periphery fastigate, parvicarinate.

Distinction.—From *D. Moorei*, the want of a costate stage; the definite inner margin (Lycett says of his species “inner border of whorls not truncated,” p. 122). From *D. subexcentrica*, the want of costæ in the umbilicus, the more definite periphery and carina.

Localities and Strata.—Dorset: Bradford Abbas, Yeovil Sands, upper part; Chideock Quarry Hill, Bridport Sands—specimens at a fossiliferous horizon 50 feet from top of sands and from where opalinoid Ammonites occur, 110 feet from base of sands, and 180 feet from first appearance of *Dumortieria* in so-called Upper Lias clay.

The strata on Dorset coast (sands and clay) which yield *Dumortieria* are about 200 feet in thickness.

Date of Existence.—*Moorei* hemera.

29. DUMORTIERIA sp. Plate XLIV, figs. 4—6. Suppl., Fig. 182, p. cxvii.

1891. DUMORTIERIA MOOREI, *This Monogr.*, Pl. xlv, figs. 4—6.

Remarks.—This form lacks the costate umbilicus of *D. Moorei*, the excentrumbilicus of *D. subexcentrica*; the definite inner margin of *D. linearis*. It has also a less definite periphery than the typical *D. linearis*, a slightly larger umbilicus, and is thinner.

Widely umbilicate species.

Compare with *D. subsolaris* for the costate ally.

30. DUMORTIERIA LATA, *S. Buckman*. Plate XLIV, figs. 1—3. Suppl. Fig. 183, p. cxvii.

1885. AMMONITES cf. RADIAN, *Quenstedt*, *Amm. Schwäb. Jura*, Pl. liv, fig. 19.

1891. DUMORTIERIA RADIAN, var. EXIGUA, *This Monogr.*, Pl. xlv, figs. 1—3 only.

Description.—Subplatyleptogyral; latumbilicate; spissiparvicostate; periphery subacutifastigate, parvicarinate.

Distinction.—From *Dum. signata*, the larger umbilicus, as mentioned in p. 252. The costæ are also rather more distant and distinct.

31. *DUMORTIERIA EXIGUA*, S. Buckman. Plate XLIII, figs. 11, 12. Suppl., Fig. 184, p. cxcvi.

1891. *DUMORTIERIA RADIANS*, var. *EXIGUA*, This Monogr., Pl. xliii, figs. 11, 12.

Description. — Subplaty-subleptogyral; latumbilicate; spissiparvicostate to striate; periphery fastigate, parvicarinate.

32. *DUMORTIERIA* sp. Plate XLIII, figs. 1—4.

1891. *DUMORTIERIA RADIANS*, This Monogr., Pl. xliii, figs. 1—4.

Remarks. A young example depicted to show the ontogeny. It has a larger umbilicus than the last species.

SUBFLEXIRADIATE.

In this group the radial line has a slight curve on the lateral area; the umbilicus is large, and considerable compression is attained even while a strongly costate stage is present. These are all factors of distinction from true *Dumortieria*, where the radial line is straight, at least until the striate stage is well advanced, where the umbilicus tends to contract as soon as compression commences, and where such compression does not become pronounced until costal degeneration has nearly attained the striate stage.

The comparative development may be expressed somewhat in this way: In the flexicostate series the *prisca* style of distant ribbing and wide umbilication are found persisting until considerable whorl compression has been reached. So in the recticostate series the *prisca* style of ribbing is associated with circular whorls, in the flexicostate series with compressed elliptical whorls.

The present group admits of division into two series, but only in regard to size:

(1) *Latescens* series, large forms. *Dum. latescens*, *Dum. arenaria*, which is perhaps young of a larger form, and the species called *Dum. subundulata*, var. *striatolocostata* by Haug in 'Polymorphidæ,' N. Jahrbuch f. Mineral., 1887, Bd. II, Pl. V, fig. 4.

(2) *Subundulata* series, all seem to be dwarf forms, *Dum. subundulata* and its allies.

A. *The Latescens series.*

33. DUMORTIERIA LATESCENS, *S. Buckman*. Plate XLIII, figs. 8—10. Suppl., Fig. 185, p. cxcvi.

1890. DUMORTIERIA SUBUNDULATA, *This Monogr.*, Pl. xliii, figs. 8—10.

1902. — LATESCENS, *Emend. Ann. Nom.*, p. 5.

Description.—Subplatyleptogyral; latumbilicate; parvicostate (with an intermediate striate stage) passing to somewhat smooth (with irregular obscure ribs). Periphery subacutifastigate to convex, parci- to obsoleticarinate.

Remarks.—In other specimens the intermediate striate stage is more pronounced.

Localities and Strata.—Somerset: Stoford, shelly beds of Yeovil Sands; North Stoke, near Bath (Cotteswold district) sandy strata in Cephalopod Bed, collected by the late E. Wilson, F.G.S.

Date of Existence.—*Moorei*, or *Dumortierix* hemera.

34. DUMORTIERIA ARENARIA, *S. Buckman*. Suppl., Plate XXII, figs. 34—36.

Description.—Subplatyleptogyral; latumbilicate; costate declining to parvicostate and to irregulari-subcostate; periphery acutifastigate, parvicarinate.

Distinction.—From *D. latescens*, coarser, more distant, costæ, sharper periphery.

Locality and Stratum.—Dorset: Bradford Abbas, in the Yeovil Sands.

Date of Existence.—*Moorei* hemera, presumably.

B. *The Subundulata (or dwarf) series.*

35. DUMORTIERIA TABULATA, *S. Buckman*. Suppl., Plate XXII, figs. 25—27.

Description.—Subplatysubleptogyral (almost subpachygyral); latumbilicate; costate; periphery tabulate, parvicarinate.

Locality and Stratum.—Gloucestershire: Penn Wood, Cephalopoda Bed (“*Dumortieria* Beds”), E. Wilson.

36. DUMORTIERIA EXPLANATA, *S. Buckman*. Suppl., Plate XXII, figs. 28—30.

Description.—Subplatysubleptogyral (almost leptogyral); latumbilicate; costate; periphery subtabulate, parvicarinate.

Distinction.—From *D. tabulata*, the thinner whorls, and less tabulate periphery.

Localities and Strata.—Gloucestershire: Penn Wood, Cephalopoda Bed ("Dumortieria Beds"); Cam Down, similarly.

Date of Existence.—*Dumortieria* hemera.

37. *DUMORTIERIA SUBUNDULATA* (*Branco*). Plate XLV, figs. 1—3.

1879. *HARPOCERAS SUBUNDULATUM*, *Branco*, Unt. Dogger, Abh. Geol. Spez. Karte Elsass-Lothringen, Bd. ii, Pl. iii, fig. 4 only.

1892. *DUMORTIERIA SUBUNDULATA*, This Monogr., Pl. xlv, figs. 1—3.

Distinction.—From *D. explanata*, the more acute periphery, the more distant ribs.

Localities and Strata.—Gloucestershire: Buckholt Wood, *Moorei* Beds; Bowcott Wood.

38. *DUMORTIERIA RUSTICA*, *S. Buckman*. Plate XLV, figs. 4, 5 (type), figs. 10—12.

1892. *DUMORTIERIA SUBUNDULATA*, This Monogr., Pl. xlv, figs. 4, 5, 10—12.

1902. — *RUSTICA*, Emend. Amm. Nom., p. 5.

Description.—Subplatysubleptogyral, latumbilicate; costate passing to spissiparvicostate; periphery fastigate, subcarinate.

Distinction.—From *D. subundulata*, more numerous and closer set costæ; thinner whorls. From *D. explanata*, decline to parvicostate stage, sharper periphery.

Localities and Strata.—Gloucestershire: Penn Wood, Cam Down, in the Cephalopod Bed.

39. *DUMORTIERIA MUNDA*, *S. Buckman*. Plate XLIV, figs. 10—12.

1891. *DUMORTIERIA SUBUNDULATA*, This Monogr., Pl. xlv, figs. 10—12 only.

1902. — *MUNDA*, Emend. Amm. Nom., p. 5.

Description.—Subplatysubleptogyral, sublatumbilicate; subcostate passing to striate; fasciate; periphery fastigate, parvicarinate.

Distinction.—From *Dum. rustica*, the finer ornament, the smaller umbilicus.

40. *DUMORTIERIA BRANCOI*, *S. Buckman*. Plate XLV, figs. 8, 9.

1879. *HARPOCERAS PSEUDORADIOSUM*, *Branco*, Unt. Dogger, Abh. Geol. Karte Elsass-Lothringen, Pl. ii, fig. 3 only.

1892. *DUMORTIERIA SUBUNDULATA*, This Monogr., Pl. xlv, figs. 8, 9.

1902. — *BRANCOI*, Emend. Amm. Nom., p. 5.

Description.—Subplatysubleptogyral, latumbilicate; spissiparvicostate; periphery fastigate, parvicarinate.

Distinction.—From *Dum. munda*, the costation, the larger umbilicus.

Localities and Strata.—Gloucestershire: Frocester Hill, Cephalopod Bed; Dorset: Chideock Hill, Bridport Sands with *D. linearis*.

41. DUMORTIERIA EXACTA, *S. Buckman*. Plate XLV, figs. 6, 7.

1892. DUMORTIERIA SUBUNDULATA, This Monogr., Pl. xlv, figs. 6, 7.

1902. — EXACTA, Emend. Amm. Nom., p. 5.

Description. — Subplatyleptogyral; latumbilicate; subspissi-subparvicostate; periphery subacutifastigate, subcarinate.

Distinction.—From *D. Brancoi*, more definite costation, thinner whorls, more acute periphery.

Localities and Strata.—Gloucestershire: Buckholt Wood, Cam Down, Penn Wood, Cephalopod Bed, upper part ("Moorei Beds").

IV. Genus—FONTANNESIA¹, *S. Buckman*.

(Type: *Dumortieria grammoceroïdes*, Haug.).

1891. DUMORTIERIA, pars, This Monogr., p. 231.

1902. FONTANNESIA, Emend. Amm. Nom., p. 6.

Definition.—Subplatysubleptogyral; latumbilicate; subdensiseptate; sublongi-angusti-ornati-lobate; laterally subflexiradiate; peripherally latanguliradiate; convex, parvicarinate. (Radial line, fig. 186, p. cxvii.)

Notes.—Such are the characters of the typical series, modifiable according to the degree of development. But there are other series which do not quite conform, even allowing for developmental variation. Thus a periphery convex and carinate is found, and a costation varying from subflexiradiate to subrectiversiradiate is shown.

Distinction.—From *Dumortieria*, the more ornate suture-line, and the longer peripheral projection of the radial line. The costæ lack that annular appearance so noticeable in *Dumortieria*.

Remarks.—The species of this genus are interesting for the likeness in certain cases to species of *Sonninia*,² from which, however, they are separable by the suture-line with dependent inner portion. This suture-line is of the type of that

¹ In honour of F. Fontannes, collaborator with E. Dumortier.

² See p. 339, and footnote ¹, p. 340.

found in the family Polymorphidæ, but is more ornate than in other genera, except *Uptonia*. It has a certain likeness to that of *Hammatoceras*, and curiously enough certain species of this genus have some outward resemblance to certain, as yet undescribed, species of that genus which occur in the same bed: the species of *Fontannesia* may, however, be distinguished by lacking the pronounced carina, which is also a septicarina, of the species of *Hammatoceras*.

No foreign locality, so far as I am aware, has yielded any species of this genus. Hitherto nearly all the specimens have come from a small area within about two miles' radius of Bradford Abbas, Dorset; only one or two have come from places a little more distant. Much interest therefore belongs to a specimen of this genus found by Mr. J. W. Tutchter so far away as Dundry, Somerset, which is not only more than 30 miles from Bradford Abbas, but is separated therefrom by the Mendip axis.

The earliest species to be named was called *Harpoceras Boweri*; the next was designated *Dumortieria grammoceroides*, named by Dr. Haug from a British example of which he has very kindly sent me a plaster cast. Before this, species of the genus had long been known by the name *Am. Levesquei*.

Typical series.

1. FONTANNESIA EXPLANATA, *S. Buckman*. Plate XLVI, figs. 6, 7. Suppl., Fig. 187, p. cxcvi.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlv, figs. 6, 7.

1902. FONTANNESIA EXPLANATA, Emend. Amm. Nom., p. 6 (xlvii misprint).

Description.—Subplatysubleptogyral, latumbilicate; subpaucicostate; periphery fastigate, subcarinate.

Localities and Stratum.—Dorset: Bradford Abbas, Fossil Bed; Louse Hill, near Halfway House.

Date of Existence.—*Discitæ* hemera.

2. FONTANNESIA GRAMMOCEROIDES (*Haug*). Plate XLVI, figs. 1—3. Plate XLVII, figs. 15—17; Suppl., Fig. 186, p. cxcvi.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlv, figs. 1—3; Pl. xlvii, figs. 15—17, p. 262.

1902. FONTANNESIA — Emend. Amm. Nom., p. 6.

Distinction.—From *Font. explanata*, the broader, flatter periphery, also the somewhat smaller umbilicus and the rather stouter whorls.

3. FONTANNESIA LUCULENTA, *S. Buckman*. Plate XLVI, figs. 4, 5 (type), fig. 8.
Plate XLVII, figs. 10—12.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlv, figs. 4, 5, 8; Pl. xlvii, figs. 10—12.

1902. FONTANNESIA LUCULENTA, Emend. Amm. Nom., p. 6.

Description.—Sublatumbilicate; subspissi-subparvicostate; periphery subfastigate, subcarinate.

Distinction.—From *Font. grammoceroides*, the somewhat smaller umbilicus, the smaller, more closely set, costæ.

4. FONTANNESIA OBRUTA, *S. Buckman*. Suppl., Plate XXIV, figs. 8—11.

1892. DUMORTIERIA SP., This Monogr., p. 340, footnote.

Description.—Sublatumbilicate, parvi- to obsoleti-costate; periphery subfastigate, parvicarinate.

Distinction.—From *Font. luculenta*, the more degenerate style of costation.

Locality and Stratum.—Dorset: Bradford Abbas, in the Fossil Bed.

Date of Existence.—*Discitæ* hemera, presumably (by matrix).

Carinate series.

5. FONTANNESIA CABINATA, *S. Buckman*. Plate XLVII, figs. 13, 14.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlvii, figs. 13, 14.

1902. FONTANNESIA CABINATA, Emend. Amm. Nom., p. 6.

Description.—Rursi- and subcrassicostate; periphery rounded to subfastigate, subcarinate to carinate.

Remarks.—In the inner whorls of the specimen depicted in Plate XLVII, fig. 13, the ribs are not shown coarse enough.

Localities and Strata.—Dorset: Bradford Abbas, Fossil Bed; Halfway House, from equivalent bed.

Date of Existence.—*Discitæ* hemera, presumably.

Dwarf series.

A. Rursicostate (with lateral auricles).

A. *Flexicostate*.

6. FONTANNESIA CURVATA, *S. Buckman*. Plate XLVII, figs. 1, 2 (type), figs. 3, 4, 5.
Plate LXV, Figs. 6, 7.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlvii, figs. 1—5; Pl. lxxv, figs. 6, 7.

1902. FONTANNESIA CURVATA, Emend. Amm. Nom., p. 6.

Description.—Latumbilicate, flexi-rursi-costate : periphery rounded, practically non-carinate.

Remarks.—The figured specimens show lateral (mouth-border) lappets, or signs thereof, at 16, 32, 36 mm. diameter. Other examples show them at 28 mm. (two) and at 32 mm.

Localities and Stratum.—Dorset : Bradford Abbas, Fossil Bed ; Somerset : Stoford. A not uncommon species.

Date of Existence.—*Discitæ* hemera.

b. Subflexicostate.

7. FONTANNESIA BOWERI (*J. Buckman*). Suppl., Plate XXIV, figs. 1—4 (type refigured).

— AMMONITES BOWERI. *J. Buckman*, MS.

1883. HAPOCERAS BOWERI, *S. Buckman*, New Spp. Amm. ; Proc. Dorset Club, vol. iv, p. 145, woodcut.

1889. SONNINIA BOWERI (*pars*), This Monogr., p. 119.

1902. FONTANNESIA BOWERI, *Emend. Amm. Nom.*, p. 6.

Remarks.—This is a most noteworthy species. The type form was at one time thought to be the same as *Sonninia Zurcheri* (Douvillé), which, however, it precedes by two years ; and so the name *Sonninia Boweri* was used. But it is not a *Sonninia* ; the suture-line, which can be seen obscurely through the test, has a dependent inner portion. Also *Boweri* differs from *Zurcheri* in not having such flexed costæ, nor the sulci beside the carina, nor so distinct a carina.

The name was suggested by my father in honour of his friend the Rev. — Bower, of Closeworth, Somerset, a geologist.

Distinction.—From *F. luculenta* ; a smaller umbilicus and less distinct costæ.

Locality and Stratum.—Dorset : Bradford Abbas, Fossil Bed.

Date of Existence.—*Discitæ* hemera.

c. Subrecticostate.

8. FONTANNESIA AURITA, *S. Buckman*. Suppl., Plate XXIV, fig. 7.

Description.—Sublatumbilicate ; crassicostate ; periphery rounded, parvicarinate, with area each side of carina slightly depressed.

Distinction.—From *F. Boweri*, more costate, more umbilicate, and thinner.

Locality and Stratum.—Dorset : Halfway House (Compton), near Sherborne, presumably from bed equivalent to the Bradford-Abbas Fossil Bed.

Date of Existence.—*Concavi* or *Discitæ* hemera, presumably.

9. FONTANNESIA CONCENTRICA, *S. Buckman*. Suppl., Plate XXIV, figs. 5, 6.

Description.—Subplatysubleptogyral; sublatumbilicate, concentrubilicate; costate, periphery convex, parvicarinate.

Distinction.—From *F. aurita*, less strongly costate, and barely carinate.

Locality and Stratum.—Dorset: Louse Hill, near Halfway House (Compton), presumably from strata equivalent to Bradford-Abbas Fossil Bed.

Date of Existence.—*Concavi* or *Discitæ* hemera, presumably.

B. Versi- or prorsicostate (without lateral auricles, so far as evidence shows).

10. FONTANNESIA TORTIVA, *S. Buckman*. Plate XLVII, figs. 8, 9.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlvii, figs. 8, 9.

1902. FONTANNESIA TORTIVA, Emend. Amm. Nom., p. 6 (figs. 6, 7 misprint).

Description.—Latumbilicate; subrectisubversi- (to subprorsi-) costate; periphery convex, parvicarinate.

Locality and Stratum.—Dorset: Bradford Abbas, upper part of Fossil Bed.

Date of Existence.—*Discitæ* hemera.

11. FONTANNESIA DESPECTA, *S. Buckman*. Plate XLVII, figs. 6, 7.

1892. DUMORTIERIA GRAMMOCEROIDES, This Monogr., Pl. xlvii, figs. 6, 7.

Description.—Subplatysubleptogyral; latumbilicate; subrecti- prorsi- parvicostate; periphery subtabulate, parvicarinate.

Distinction.—From *D. tortiva*, the more numerous, smaller costæ.

Remarks.—A common form at Bradford Abbas, but it seems always to be small. The largest of 16 specimens is 37 mm. in diameter.

Localities and Strata.—Dorset: Bradford Abbas, upper part of Fossil Bed; Somerset: Dundry (Mr. J. W. Tutchter), presumably from below the White Iron-shot.

Date of Existence.—*Discitæ* hemera.

NOTE.—Since the above articles were written, a specimen of this genus has been found in the Lower *Trigonia*-Grit (*discitæ* η) of the Cheltenham district. I have recorded it as *F. cf. tortiva* in 'Handbook Geol. Cheltenham,' by L. Richardson, 1904, p. 230.

III. REVISION OF, AND ADDITIONS TO, VARIOUS FAMILIES.

Family—AMALTHEIDÆ.

Sub-family—SONNININÆ.

Genus—ZURCHERIA, Douvillé.

ZURCHERIA PUGNAX (*Vacek*). Suppl., Fig. 188 in text.

1892. ZURCHERIA PUGNAX, This Monogr., p. 298.

1895. — PUGNAX, *Brasil*, Ceph. Nouv.; Bull. Soc. Géol. Normandie, vol. xvi, Pl. ii, figs. 4, 5.

1902. — PUGNAX, *S. Buckm.*, Emend. Amm. Nom., p. 7.

This was noticed as a foreign species at p. 298. It can now be recorded as British. A specimen in beautiful preservation, 53 mm. in diameter, was obtained by me from the workmen at Stoke Knap, Dorset, some years ago. It came evidently from the Building Stone, and by its matrix perhaps from the lower part;

that would make its date *Bradfordensis* hemera; but it may be later.



FIG. 188.—*Zurcheria pugnax*.

This example is a whorl larger than Vacek's, and shows on this whorl decline of the bispinous stage—in fact, the ornament on this whorl is just that of *Haplopleuroceras*. The periphery, however, is quite convex, shows no carina nor furrows; but the small costæ pass over this periphery, making linguiform figures.

This specimen is most interesting in its bearing on my remarks as to the genealogy of *Haplopleuroceras*, p. 299. My thanks are due to Mr. J. W. Tutchet for the two photographs.

Genus—DORSETENSIA, *S. Buckman*.

DORSETENSIA LENNIERI, *Brasil*. Plate LII, figs. 1—3.

1892. DORSETENSIA SP., This Monogr., Pl. lii, figs. 1—3, p. 304.

1895. — LENNIERI, *Brasil*, Ceph. Nouv., Bull. Soc. Géol. Normandie, vol. xvi, Pl. iii, figs. 10, 11, p. 10.

Found in Normandy by Mr. L. Brasil.

The present is most likely the more correct position—at any rate, it belongs to the *Sonnininae*. Since it was described I have been able to work certain disused quarries around Sherborne, and I can therefore judge that the horizon of this species is probably *Witchellia* beds, certainly not *Murchisonæ* or *Concavus* beds. See Baj. Sherborne Dist., Quart. Journ. Geol. Soc, vol. xlix, p. 480.

Family—OPPELIDÆ.

Genus—ÆCOTRAUSTES, *Waagen*.

(Type: *Æcotraustes genicularis*, *Waagen*.)

1869. ÆCOTRAUSTES, *Waagen*, Formenreihe Am. subradiatus; Geol. Pal. Beiträge, Bd. ii, Heft ii, p. 251. Spelt "*Oecotraustes*" in explanation of Plates.

ÆCOTRAUSTES, AUCT.

That the Hectici were related to *Ludwigia* was the opinion of several palæontologists. The species called *Æcotraustes* were figured in Plates XX, XXI as being related to the Hectici, which is perhaps correct, and hence to *Ludwigia*. But before they were described the *Ludwigia* connexion was seen to be untenable; these species belonged to the Oppelidæ, though the idea that the Hectici were related to *Ludwigia* was still clung to. Bonarelli, however, considers that the Hectici belong to the Oppelidæ, and that seems to be most likely.

As the specimens of *Æcotraustes* that happened to be figured have not been described in the body of the work, it is advisable to consider them here.

ÆCOTRAUSTES RUGOSUS, *S. Buckman*. Plate XXI, figs. 1, 2. Suppl., Fig. 189, p. cxcvi

1889. ÆCOTRAUSTES RUGOSUS, This Monogr., Pl. xxi, figs. 1, 2.

Description.—Subplatysubleptogyral; subangustumbilicate; costate; periphe subconvex, parvicarinate.

Note.—Plain costate stage until 29 mm. diameter, then begins a stage w nodate-ended costæ.

Locality and Stratum.—Somerset: East Coker, from the upper beds.

Date of Existence.—Probably hemera *Truelli*.

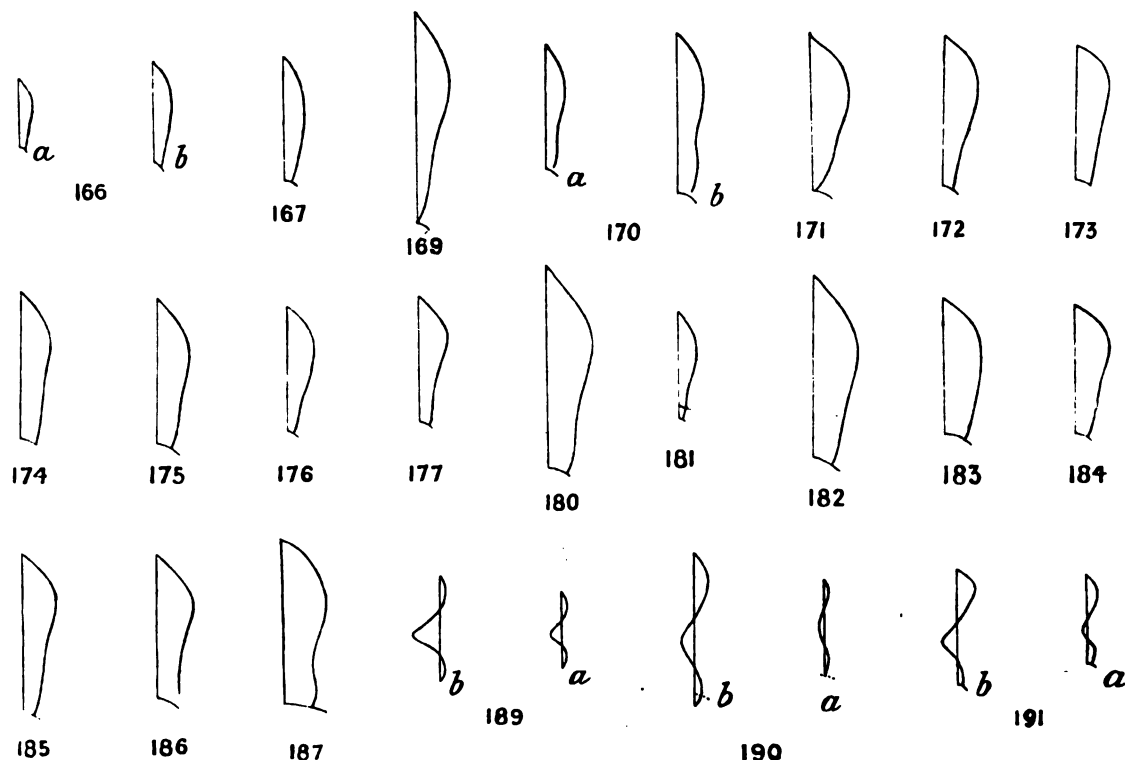
ÆCOTRAUSTES COSTIGER, *S. Buckman*. Plate XX, figs. 15—17. Suppl., Fig. 190, p. c

1889. ÆCOTRAUSTES CONJUNGENS, This Monogr., Pl. xx, figs. 15—17.

Description.—Platysubleptogyral; excentrumbilicate; parvicostate, costæ

SUPPLEMENT, TABLE IV.

Radial lines.—POLYMORPHIDÆ, OPPELIDÆ.



- Fig. 166.—*Dumortieria costula*, p. clxxv. (a, from specimen figured in Pl. XXXVII, figs. 12, 13; b, from that in Pl. XXXVII, figs. 18, 19.)
- Fig. 167.—*Dumortieria munieri*, p. clxxv. (From specimen in Pl. XXXVII, figs. 14, 15.)
- Fig. 169.—*Dumortieria externicostata*, p. clxxvii. (From specimen in Pl. XL, figs. 1, 2.)
- Fig. 170.—*Dumortieria mutans*, p. clxxvii. (From specimen in Pl. XL, figs. 3—9.)
- Fig. 171.—*Dumortieria declinans*, p. clxxvii. (From specimen depicted in Pl. XL, figs. 10—12, at two stages: a, subcostate; b, degenerate subcostate.)
- Fig. 172.—*Dumortieria yeovilensis*, p. clxxviii. (From example in Pl. XXXVII, figs. 16, 17.)
- Fig. 173.—*Dumortieria metita*, p. clxxviii. (From specimen shown in Pl. XLII, figs. 11, 12.)
- Fig. 174.—*Dumortieria regularis*, p. clxxviii. (From example in Pl. XLI, figs. 4—6.)
- Fig. 175.—*Dumortieria radians*, p. clxxix. (From example in Pl. XLII, figs. 8—10.)
- Fig. 176.—*Dumortieria signata*, p. clxxix. (From specimen in Pl. XLII, figs. 6, 7.)
- Fig. 177.—*Dumortieria subfasciata*, p. clxxxi. (From specimen depicted in Pl. XXX, fig. 18.)
- Fig. 180.—*Dumortieria subexcentrica*, p. clxxxii. (From example figured in Pl. XXX, fig. 19, and Pl. XLIV, figs. 7, 8.)
- Fig. 181.—*Dumortieria linearis*, p. clxxxiii. (From specimen shown in Pl. XXX, figs. 15—17.)
- Fig. 182.—*Dumortieria*, sp., p. clxxxiii. (From specimen figured in Pl. XLIV, figs. 5, 6.)
- Fig. 183.—*Dumortieria lata*, p. clxxxiii. (From example drawn in Pl. XLIV, figs. 1—3.)
- Fig. 184.—*Dumortieria exigua*, p. clxxxiv. (From specimen in Pl. XLIII, figs. 11, 12.)
- Fig. 185.—*Dumortieria latescens*, p. clxxxv. (From specimen in Pl. XLIII, figs. 8—10.)
- Fig. 186.—*Fontannesia grammoceroideus*, p. clxxxviii. (From a plaster cast of Dr. E. Haug's holotype.)
- Fig. 187.—*Fontannesia explanata*, p. clxxxviii. (From the specimen in Pl. XLVI, figs. 6, 7.)
- Fig. 189.—*Ecotraustes rugosus*, p. cxci. (From example depicted in Pl. XXI, figs. 1, 2; a, costate stage; b, middle of nodate stage.)
- Fig. 190.—*Ecotraustes costiger*, p. cxci. (From specimen in Pl. XX, figs. 15—17; a, costate stage; b, end of nodate stage.)
- Fig. 191.—*Ecotraustes nodifer*, p. cxci. (From example in Pl. XX, figs. 13, 14; a, costate stage; b, end of nodate stage.)

IV. CONCERNING TECHNICAL TERMS.

In order to secure, so far as possible, a uniform value for the terms descriptive of the dimensions of whorl and umbilicus, it has been found advisable to use some definite standard of proportion. Such a standard is furnished by the radius—the length from the centre to the periphery. This being taken as 100, the percentage of other dimensions may be approximately stated as follows :

To 17 per cent.	{ Perstenogyral, Perleptogyral, Perangustumbilicate.	From 50 per cent. to 66 per cent.	{ Subplatygyral, Subpachygyral, Sublatumbilicate.
From 17 per cent. to 34 per cent.	{ Stenogyral, Leptogyral, Angustumbilicate.	From 66 per cent. to 83 per cent.	{ Platygyral, Pachygyral, Latumbilicate.
From 34 per cent. to 50 per cent.	{ Substenogyral, Subleptogyral, Subangustumbilicate.	From 83 per cent. to 100 per cent.	{ Perplatygyral, Perpachygyral, Perlatumbilicate.

When the dimensions exceed 100 per cent. they may be denoted by affixing the word *extreme*—. Thus certain species might be extremipachygyral, or extremilatum-bilicate, with further modification, when necessary, by *per*— and *sub*—.

There is a certain arbitrariness about the whole method, as when only a slight difference each side of a dividing line gives a different designation, while more difference, if falling at beginning and end of a division, does not give a different term, although it would be desirable in specific distinction. When a dimension falls on the dividing line, it seems advisable to take the lower denomination as the term. Proportional triangles, such as those given by P. Reynès in the frontispiece of his *Monograph*, are suitable for taking the measurements.

The descriptions from page lxxv onwards have been checked in accordance with this more exact scheme.

V. GENERIC CLASSIFICATION.

The following is a classification of the genera which have been described. They have been arranged in such order in their respective groups that, so far as possible, the sequence shall be from the least to the most modified form ; and the sequence of the groups themselves is on the same basis.

Super-family—AMMONITACEA.

Family—ARIETIDÆ. *Hudlestonia*.

Family—HILDOCERATIDÆ.

Sub-family—HILDOCERATINÆ. *Hildoceras*, *Pseudolioceras*, *Canavarella*, *Vacekia*,
Polyplectus.

Sub-family—GRAMMO CERATINÆ. *Grammoceras*, *Cotteswoldia*, *Pleydellia*, *Canavarina*,
Walkeria, *Phlyseogrammoceras*, *Pseudogrammo-*
ceras, *Asthenoceras*.

Sub-family—HAUGINÆ. *Chartronia*, *Lillia*, *Denckmannia*, *Haugia*, *Phymatoceras*,
Brodiceras.

Sub-family—GRAPHOCERATINÆ. *Graphoceras*, *Pseudographoceras*, *Platygraphoceras*,
Braunsina, *Crickia*, *Rhæboceras*, *Ludwigella*,
Ludwigia, *Kiliana*, *Wiltshireia*, *Apedogyria*,
Ludwigina.

Sub-family—LUCYINÆ. *Lucya*, *Paquieria*, *Paineia*, *Cylicoceras*, *Depaoceras*, *Lioceras*,
Cypholioceras, *Ancolioceras*.

Sub-family—HYATTEINÆ.¹ *Strophogyria*, *Hyattina*, *Hyattia*, *Cosmoggyria*, *Welschia*,
Geyeria, *Manselia*, *Brasilina*, *Brasilia*.

Sub-family—DARELLEINÆ. *Braunsella*, *Reynesia*, *Darellina*, *Darellella*, *Reynesella*,
Edania, *Hugia*, *Lopadoceras*, *Darellia*, *Stokeia*,
Dissoroceras, *Deltotoceras*, *Deltoidoceras*, *Tozolioceras*,
Hyperlioceras.

Family—AMALTHEIDÆ.

Sub-family—SONNININÆ. *Zurcheria*, *Haplopleuroceras*, *Pæcilomorphus*, *Dorsetensia*,
Sonninia.

Family—POLYMORPHIDÆ. *Polymorphites*, *Tmetoceras*, *Catullocceras*, *Fontannesia*, *Dumortieria*.

VI. AMMONITE DEVELOPMENT.

For the better understanding of the revised system of Ammonite grouping now adopted, and in accordance with which this work has been revised, it may be desirable to recapitulate briefly certain phenomena of Ammonite development. Some reference has been made to them in various places in the body of the work

¹ Spelt thus not to conflict with *Hyattina*.

(pp. 133, 288); they have been fully stated by Hyatt in his 'Genesis of the Arietidæ,' while similar phenomena of development have been proved for Cephalopoda generally by A. Hyatt, for various Ammonites by J. P. Smith, for Pelecypoda by R. T. Jackson, for Brachiopoda by Beecher, by Schuchert, by Cumings and others, and in both zoological and botanical series generally by Jackson. In fact, they are the phenomena of bioplastology.

Such phenomena of development show a certain sequence—stages of elaboration (anagenesis) are followed by stages of simplification (catagenesis); and this applies not only to the ontogeny of the individual and the phylogeny of the race, but also to the ontogeny and phylogeny of the particular features or characters which distinguish one species, one genus, one race, from another. Variation in the characters themselves along their lines of progression or degeneration is a specific, but not a generic, distinction; variation in the relative development of characters is generic, so that in such associations as A, b, c; a, B, c; a, b, C, indicating the characters of three species, the generic distinctions are the relative development expressed as A to a, b to B, c to C respectively.

Working on such lines as these in regard to Ammonites, Hyatt made for the Arietidæ some six genera, which with better knowledge would be increased perhaps to 8 or 9; but in the Hildoceratidæ continued development has produced so much complication, that, by work on similar lines, the number of genera must be increased enormously. The fauna has, however, increased far more than proportionately in richness; in Ammonites, the numerical acme and what may be called the acme of pœcilomorphy—variety of form—is reached in the period called Inferior Oolite, so that the multitude of individuals and their great diversity of characters make the task of classification a matter of extreme complexity.

In Ammonites it may be seen that there are five characters to deal with; they may be stated as follows:

- (1) Whorl-shape.
- (2) Umbilication.
- (3) Suture-line.
- (4) Test ornament—transverse and longitudinal.
- (5) Radial curve, in which rostration plays so important a part.

Each of these characters has its definite ontogenetic and phylogenetic history. To each there is a stage of anagenesis and a stage of catagenesis, and between them an acme, or period of prime development. But the acmes of the various characters are by no means coincident; and it is this diversity of incidence which produces diversity of form. With five characters, to each of which may be given, say, five stages of anagenesis and five of catagenesis, the possible number of different combinations that may be produced thereby is almost innumerable.

Any approximate coincidence of the majority of acmes of characters does not

coincide with or produce the acme of a genetic series. For another factor comes in here—individual bulk. The period of attainment of the largest individual growth by a particular species of a genetic line must be regarded as the genetic acme; and although there is a certain relation between the acme of ornament-elaboration and the acme of bulk-development, yet they do not coincide. Rather the acme of ornament is reached before the acme of bulk—sometimes shortly, sometimes at a longer period, before—as if a certain economy in reduction of ornament were necessary and favourable to the attainment of greatest individual growth.

To take examples: *Vermiceras Conybearii* compared to *Coroniceras*, *Stepheoceras* compared to *Cæloceras Blagdeni*, *Sonninia dominans* compared to *S. crassispinata*, are all cases where the acme of size comes shortly after the acme of ornament. In *Parkinsonia dorsetensis* (Wright), the giant of the Inferior Oolite, the acme of size is long after the acme of ornament—for that must be reckoned as *Cæloceras-Blagdeni*-equivalent in this series—a stage from which *Park. dorsetensis* has travelled far: it only shows the morphic representation thereof in its brephic whorls. In the *Lytoceras*, too, the growth-acme is long after the ornament-acme; for *Lytoceras fimbriatum* is about in the acme of ornament in this series; but it is a small species beside such giants as *Lytoc. sigalœn*, *L. Wrighti*, *L. confusum*, which have left the ornament-acme so far behind that they only show, at a very youthful period, traces of a stage somewhat analogous to that of *L. fimbriatum*.

To consider the various characters and their morphogeny: In whorl-shape, inflation is anagenetic, and contraction is catagenetic. In suture-line, the greater elaboration and complication is anagenetic, the simplification is catagenetic. When suture-lines do not increase their complexity more than in proportion to the whorl-increase, but become more approximate—the individual becoming more densisept and less latisept—that must be regarded as a beginning of catagenesis.

In test-ornament, elaboration is anagenetic, and simplification is catagenetic. The transverse ornament may show the following successive stages of morphogeny: in anagenesis, striation, subcostation, costation, unituberculation, bituberculation, multituberculation; and, in catagenesis, the same stages in reverse order till all ornament is again lost, and smoothness is returned to. Or, after a period of decline, renewed elaboration may take place; thus a species which shows in its ontogeny catagenesis from tuberculate to subcostate may elaborate afresh anagenetic stages from subcostate to tuberculate: *Sonninia renovata* is a notable example.

Perhaps it would be correct to regard the tuberculate stage as due to the development of longitudinal ornament across the costate transverse ornament, so breaking up the costæ into a row of tubercles in the line of intersection, which often is an angular portion of the whorl area.

Longitudinal ornament is most frequently developed on the periphery where

transverse ornament is weak; then it shows normal development in the following stages somewhat analogous to those of transverse ornament: a slight line (periphery angulate), a rib (periphery carinate), ribs and furrows (periphery carinatisulcate), and when the transverse ornament becomes stronger, knotted ribs and furrows (*Paltoleuroceras*). If, however, the area be already costate, the development of longitudinal ornament produces tuberculation directly. This would make tuberculate peripheries analogous to tuberculate lateral areas—both produced by similar development, either transverse costation of a longitudinal rib, or longitudinal costation of a transverse fold—depending on whether the transverse or the longitudinal ornament has progressed the most before the other begins, in regard to any given area.

Examples of longitudinal ornament in its simple form on the lateral area are the longitudinal striæ in *Amaltheus*, *Strigoceras*, etc., and longitudinal costæ in *Strigoceras trifurcatum* and *Str. Truelli*; these developments take place when the transverse ornament is in advanced catagenesis.

In regard to the radial curve, one of the principal features is the degree of rostration—the greater projection thereof must be regarded as anagenetic and reduction as catagenetic. This rostration is the outward projection of the median portion of the periphery—a part which in *Nautilus* is curved inwards. In *Ammonites* the variation is from no projection at all (*Graphoceras*) to a very long forward projection (*Amaltheus*, *Harpoceras*, *Schloenbachia*). In a general way the greater projection is connected with greater development of the keel on the periphery; but this rule only holds good when allied genera are considered by themselves. There may be considerable development without any keel (*Zurcheria*); when a keel appears the development attained then becomes still more pronounced.

The projection of the rostrum is often associated with general catagenesis; and not until catagenesis is in a very advanced stage is reduction of the rostrum usually found. Then it accompanies another extreme catagenetic feature—excentrum-bilication; *Ludwigia ambigua* is a good instance.

Lastly, with regard to umbilication it is difficult to say what is anagenetic and what catagenetic. It may be recognised that there are alternate stages of coiling in and coiling out. The former must, perhaps, be considered as anagenetic, though it usually occurs when the series is in general catagenetic—the character anagenetic when the series is catagenetic—which may be called morph-anagenesis in phylocatagenesis. This is very marked in regard to umbilication.

From *Orthoceras* through *Gyroceras* to *Nautilus clausus* are the various degrees of incoiling—a cone coiling more and more on itself until no umbilicus is left. The *Nautilus* style of coiling appears in *Cymbites*—a very simple Ammonoid; but from *Cymbites* to *Coroniceras* at its acme, or to *Echioceras* the process is reversed—coiling in passes to coiling out; the umbilicus constantly enlarges. In catagenetic series of Arietidæ, Hildoceratidæ, etc., coiling out changes to coiling in—the

umbilicus decreases; but sooner or later in catagenesis, depending on the series, the process changes—coiling in gives place to coiling out. When the change supervenes late, after considerable incoiling has produced angustumbilication, then the coiling out is often rapid—it produces the phenomenon which I have called excentrumbilication—*Hyperlioceras rudidiscites*, for example. When carried to excess, outcoiling produces *Ancyloceras*—a return to the Gyroceratan form. Carried to an extreme, it produces *Baculites*—a return to the *Orthoceras* mode. There is, therefore, a cycle of development—from straightness to extreme involution and back to straightness again; but in completing this cycle there are many periods of interruption—periods of renewed anagenesis¹—while return may begin long before umbilical closing is obtained, and many Ammonite stocks die out without completing the cycle.

It will be seen from the foregoing remarks how different are the times of development of the various characters—how different are the morphogenetic acmes. Thus elaboration of a suture-line (septal morphanagenesis) is frequently carried on till late phylocatagenesis. This is in obedience to mechanical necessities, which were discussed pp. 134, 138. Then development of longitudinal ornament on the periphery—the carina—may be early or late in a series, or it may be delayed altogether. And in regard to umbilication the morphanagenesis is so frequently associated with phylocatagenesis that one is inclined to look upon it as really a catagenetic feature.

From the phases of development of characters which have been detailed it will be seen what changes may be expected in the various genetic stocks, bearing in mind two principles, ontogenetic repetition of phylogeny, and earlier inheritance (tachygenesis). Taking the Hildoceratidæ which show phylocatagenesis from tuberculate to costate, to subcostate, to smooth, there will be shown in the ontogeny of each species this sequence of events carried on to a certain degree. The more catagenetic is a species, the further it will carry out the sequence. Correlated with these characters of ornament there will be catagenesis of whorl shape—from inflation to compression; anagenesis of suture-line, with possible catagenesis at last; anagenesis of rostration, also with possible catagenesis ultimately; catagenesis of such longitudinal ornament as carination,² with ultimate failure; anagenesis or closing of umbilicus, with, later, catagenesis or expansion of umbilicus (excentrumbilication), especially correlated with catagenesis of rostrum and disappearance of carina.

¹ Compare *Sphæroceras* for stages of umbilical closing, and *Morphoceras*, a descendant of a Sphæroceratoid, for stages of a closed umbilicus opening out more and more. In *Morph. dimorphum* the peculiar form is due to rapid umbilical catagenesis.

² Increased prominence of the carina gaining at the expense of compression of periphery can hardly be accounted anagenesis.

Numerically, anagenesis musters more than catagenesis: but the features which it affects are less important, and to the latter must be credited bulk-decline—a factor in which is whorl compression. For even if the same diameter should be attained, it is only gained by a great decrease in thickness.

It is now necessary to show what bearing these considerations have on the interpretation of the generic definitions and the specific descriptions.

The definition of the genus indicates the characters shown by a certain species, and by a particular specimen of that species, which is selected as the type of a certain genetic series. This type-species of the genus—the genotype—then becomes a kind of fixed point in the genetic line. The species leading up to the genotype—in a catagenetic series like the *Hildoceratidæ*—will show in the main more, and those leading from it less, accentuated characters than the genotype.¹ The ontogeny of the genotype, and of species of allied genera, will give evidence as to the course of development. If the genotype show a tuberculate stage in youth declining to costate and smooth stages in adult—expressed in the specific description, which must be read with the generic definition, as tuberculate, to costate, to levigate—then the species leading up to the genotype should show more of the tuberculate and less of the subsequent stages, while the species leading from the type should show less of the tuberculate and constantly more of the subsequent stages (compare *Sonninia* and the *Hildoceratidæ*, *passim*). If the type show inflated whorls in youth, becoming compressed in adult, the species leading up to it should show a longer persistence of inflated whorls, and little or none of the compression, the species leading from it constantly less of the inflated period and more of the compression. And so with other features. These are the phenomena of morphic prefiguration and representation (p. 315). Under circumstances such as these the specific descriptions may often seem to contradict the generic definitions; but they do not: they merely indicate the difference in the degree of development between the species and the type. The genotype of series X may be defined as sublatumbilicate, that of Y as angustumbilicate; but a smooth species assigned to X may be described as angustumbilicate, indicating the change in the series; but the smooth species of Y would probably by then be perangustumbilicate unless excentrumbilication had commenced.

If, however, the definition of the genotype of X be sublatumbilicate while a species assigned thereto be stated as latumbilicate, it indicates that such species is in an earlier stage of development, it may be ontogenetic, it may be phylogenetic, but it will be found to be the morphic prefiguration of a younger stage in the ontogeny of the genotype. In the specific descriptions some such correlation as this would be found: X 1 spinous to costate, latumbilicate, X 2 (the genotype) costate to levi-

¹ The opposite obtains in anagenesis. Compare *Arnioceras*.

gate, sublatumbilicate. At the same time specimens of X 2 smaller than the actula specimen described should show, but in a reduced form, characters approximating to X 1 (morphic representation), and specimens larger than the type should show, but at a later date, characters which would be expected to belong to X 3—in a catagenetic series—(morphic prefiguration).

There has been no space in the descriptions in this supplement to deal with the ontogeny of each genotype; but these rules will show what may be expected, and by placing series of allied genera side by side—in which one supplements stages lacking in another—the ontogeny and the phylogeny of the genotypes may be observed.

When, as types of genetic series, species in different stages of development have been taken, the definition may not only show the difference between them—it may express more or it may indicate less. X smooth is angustumbilicate, Y costate is the same. If smooth X and costate Y be taken as the genotypes, the characters of umbilication appear in the definition as the same, so that apparently the umbilication is not a character of distinction in this case. And yet it may be: the association in which the same umbilicus is found gives the distinction—in X angustumbilication is associated with the smooth stage, but in Y with the costate; the difference then is between X angustumbilicate + smooth, Y the same + costate, or, comparing morphic equivalents, which should always be done, between smooth X angustumbilicate and smooth Y perangustumbilicate.

These remarks, it is hoped, will make clear the methods which have guided the arrangement of this supplement, wherein an immense series of species had to be dealt with in a limited space. In conclusion, one great difference in the point of view concerning a genus may be brought to mind. Formerly the genus embraced a series of so many homœomorphous species, now the genus comprises what may be called the heteromorphous stages of a phylogenetic series. The difference is most important. In simpler language, once the genus had a horizontal range, now it has a vertical extension. Now the genus indicates a phylogenetic series; and what is the course of that series is determined by the ontogeny of any one species in it.

VII. GEOLOGICAL DETAILS.

The title under which this monograph has been issued is “Inferior Oolite Ammonites,” and yet in many cases the species are stated to come from the “Upper Lias.” This is not a contradiction; it only means that the investigations carried on during the progress of this work for the elucidation of the Ammonite horizons have shown the contemporaneity of certain so-called “Inferior Oolite” and certain so-called “Upper Lias” strata.

The title “Inferior Oolite” was taken in the first place to denote the Inferior

The next table is a guide to the localities mentioned in this work, and gives information concerning the correlation of the deposits, together with the distinctive names by which the strata may happen to be known. It will be a guide to the stratigraphical position of the beds which have been mentioned in the text.

<i>Fusæ</i>	DORSET: Bridport . . .	"The scroff," a marly stone on top of limestones; and some of the overlying clay.
	Bradford Abbas, Halfway House, etc.	The upper part of the white stone which is burnt for lime.
<i>Zigzag</i>	DORSET: Broad Windsor, Bridport	The upper limestones, or <i>zigzag</i> beds.
	Bradford Abbas, Halfway House, etc.	The lower part of the white stone.
	SOMERSET: Crewkerne Station	The upper limestones.
	Dundry	? The strata at Barnes Batch. The Coralline Beds.
	GLOUCESTERSHIRE: Cotteswolds	? Limestones above the <i>Clypeus</i> -grit. ? Upper part <i>Clypeus</i> -grit.
	NORMANDY: Port-en-Bessin	Blue calcareous stone beds, about level of shore, east of the village.
<i>Truellii</i>	GLOUCESTERSHIRE: Cotteswolds	The <i>Clypeus</i> -grit (? lower part only).
	SOMERSET: Dundry	The Freestone.
	DORSET: Halfway House	The fossil-bed with <i>Strigoceras Truellii</i> and <i>Parkinsonia dorsetensis</i> .
	Bridport	A hard, bluish limestone.
<i>Garantiani</i>	GLOUCESTERSHIRE: Cotteswolds	The Upper <i>Trigonia</i> -grit.
	SOMERSET: North Stoke, Midford	The Upper <i>Trigonia</i> -grit.
	Dundry	The Conglomerate-bed of Maes Knoll; the thin bed below the Freestone at other places.
	DORSET: Sherborne	The Building Freestone.
	Bradford Abbas, Halfway House, etc.	"Marl Bed" and adjacent strata.
<i>Niortensis</i>	DORSET: Osborne	The upper part of the roadstone.
<i>Blagdeni</i>	DORSET: Osborne	The lower part of the roadstone.
<i>Sauzei</i>	GLOUCESTERSHIRE: Cleeve Hill	The <i>Phillipsiana</i> beds.
	DORSET: Sandford Lane	The upper part of the Fossil bed.
	SOMERSET: Dundry	The Iroushot Oolite.
<i>Witchellii</i>	DORSET: Sandford Lane	The middle part of the Fossil bed.
	Chideock	The upper part of the "Red beds."

	<p> GLOUCESTERSHIRE: Cold Comfort, Cleeve Hill SOMERSET: Dundry </p>	<p> An ironshot limestone, with <i>Terebr. Wrighti</i> and <i>Witchellia</i>. The Upper White Ironshot. </p>
<i>Sonniniæ</i>	<p> GLOUCESTERSHIRE: Cotteswolds DORSET: Sandford Lane SOMERSET: Dundry. </p>	<p> The Notgrove Freestone, and the <i>Gryphite</i>-grit of Leckhampton, etc. The lower part of the Fossil bed. The Lower White Ironshot—the <i>fissilobata-ovalis</i> horizon. </p>
<i>Discitæ</i>	<p> GLOUCESTERSHIRE: Cotteswolds DORSET: Bradford Abbas Sandford Lane Stoke Knap SOMERSET: Dundry. Horethorne Down, Seven Sisters </p>	<p> The <i>Buckmani</i>-grit, and the Lower <i>Trigonia</i>-grit. The upper part of the Fossil bed. Below the Fossil bed. Top of Building Stone. The upper part of the Grey Limestone and Marl beds. Bluish clay with Brachiopods. </p>
<i>Concavi</i>	<p> GLOUCESTERSHIRE: Cotteswolds SOMERSET: Dundry. DORSET: Bradford Abbas Sandford Lane Stoke Knap </p>	<p> The Snowhill Clay, and the Harford Sands. The lower part of the Grey Limestone and Marl beds. The lower part of the Fossil bed. A bluish sandy bed. Middle of Building Stone. </p>
<i>Bradfordensis</i>	<p> GLOUCESTERSHIRE: Cotteswolds DORSET: Bradford Abbas Halfway House, Louse Hill, Marston Road, etc. Chideock Stoke Knap SOMERSET: near Corton </p>	<p> The Upper Freestone, and the Oolite Marl. A marl bed associated with the Paving bed. The <i>Rhynchonella ringens</i> beds. Ironshot stone above Wild bed. The base of the Building Stone. The <i>Rhyn. ringens</i> beds. </p>
<i>Murchisonæ</i>	<p> GLOUCESTERSHIRE: Cotteswolds SOMERSET: Dundry. Misterton, Haselbury, etc. DORSET: Bradford Abbas Near Sherborne Stoke Knap Broad Windsor Chideock </p>	<p> The Lower Freestone, and the Pea-grit. The hard, irony, massive beds. The "lower beds." The Paving bed. Lower part of stone beds. The "bottom bed." The "lower beds." The "Wild bed." </p>
<i>Scissi</i>	<p> GLOUCESTERSHIRE: Cotteswolds DORSET: Stoke Knap Burton Bradstock NORTHAMPTONSHIRE: Duston OXFORDSHIRE: Otley Hill </p>	<p> The Sandy Ferruginous Beds, at Frocester Hill known as the Bug-stone. The <i>Brachiopod</i>-beds in the Sands. The bed below that with "Snuff-boxes." Northampton Sands. <i>Rhynch. subdecorata</i> bed. </p>

- Opaliniformis* . GLOUCESTERSHIRE: Frocester and Haresfield district . Hard ironshot stone capping the *Cephalopod*-bed.
DORSET: Bridport and Chideock . Upper part of Sand beds.
- Aalensis* . GLOUCESTERSHIRE: Frocester and Haresfield district . Top of the *Cephalopod*-bed.
SOMERSET: Dundry . . . A bluish clay stone.
DORSET: Chideock and Bridport . Towards upper part of Bridport Sands.
- Moorei* . GLOUCESTERSHIRE: Frocester district . A portion of *Cephalopod*-bed.
SOMERSET: Ham Hill . . . Building stone.
Stoford Upper part of Yeovil Sands, with some building stone.
Yeovil Upper part of Sands.
DORSET: Bradford Abbas . . . Upper part of Yeovil Sands, and the "Dew Bed."
Chideock Rather above middle part of Bridport Sands.
- Dumortieræ* . GLOUCESTERSHIRE: Frocester district . The middle part of the *Cephalopod*-bed—brown ironshot marl, a very Ammonitiferous horizon at Penn Wood, Dursley, etc.
SOMERSET: Dundry . . . The Upper Clay beds.
Ham Hill and Yeovil district . The Yellow Sands.
DORSET: Bradford Abbas district . Yellow and Blue Sands.
Chideock Blue clay ("Upper Lias") of Down Cliffs about 70 feet, and about 100 feet of yellow sand above.
Bridport Much of the Yellow Sands, cf. Chideock.
YORKSHIRE: Blea Wyke . . . The Yellow and Grey Sands below Dogger.
- Dispansi* . GLOUCESTERSHIRE: Frocester district . About middle of *Cephalopod*-bed.
SOMERSET: North Stoke . . . A brown, ironshot, marly stone.
Near Cole, Somerset and Dorset Railway Yellow sands, with hard sandstone, yielding *Hammatocerata*.
Ilminster district Top of "Upper Lias" clay, below Yeovil Sands.
- Struckmanni* . GLOUCESTERSHIRE: Frocester district . The lower part of the Cotteswold *Cephalopod*-bed.
SOMERSET: Bath The lower part of the Midford Sands.
Dundry Part of blue ironshot beds.
Cranmore P. 168.
- Striatuli* . GLOUCESTERSHIRE: Frocester district . The base of the Cotteswold *Cephalopod*-bed.
Sodbury Yellowish sand and hard sandstones.

SUPPLEMENT, PLATE XX.

Discitæ hemera.

Figs. 1—3.—*BRAUNSINA FASTIGATA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page c.)

Figs. 4—6.—*BRAUNSINA CORNIGERA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page c.)

Figs. 7—9.—*BRAUNSINA PROJECTA*, *S. Buckman*.
Dundry (Somerset), "Limestone and Marl Beds." From the late Mr. E. Wilson. (Page c.)

Figs. 10—12.—*BRAUNSINA ? SUBQUADRATA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." Collection of Mr. Darell Stephens, F.G.S. (Page ci.)

Figs. 13—15.—*PSEUDOGRAPHOCERAS ? CARINIFERUM*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." From my father's Collection. (Page xciii.)

Figs. 16—18.—*PLATYGRAPHOCERAS CARBATINUM*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page xciv.)

Figs. 19—21.—*PLATYGRAPHOCERAS LATUM*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page xciv.)

Figs. 22—24.—*GRAPHOCERAS DEBILE*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." Collection of Mr. D. Stephens, F.G.S. (Page xcvi.)

Murchisonæ hemera ?

Figs. 25—27.—*LUDWIGELLA GLEVENSIS*, *S. Buckman*.
Cheltenham neighbourhood. Pea-grit Series? From the Collection of the late Dr. Thomas Wright, F.R.S. (Page lxxxix.)

Bradfordensis hemera.

Figs. 28—30.—*LUDWIGELLA ARCUATA*, *S. Buckman*.
Stoke Knap (Dorset), "Building Stone." (Page lxxxix.)

Concavi hemera.

Figs. 31—33.—*LUDWIGELLA CASTA*, *S. Buckman*.
Stoke Knap (Dorset), "Building Stone." Collection of Mr. D. Stephens. (Page lxxxix.)

Bradfordensis hemera ?

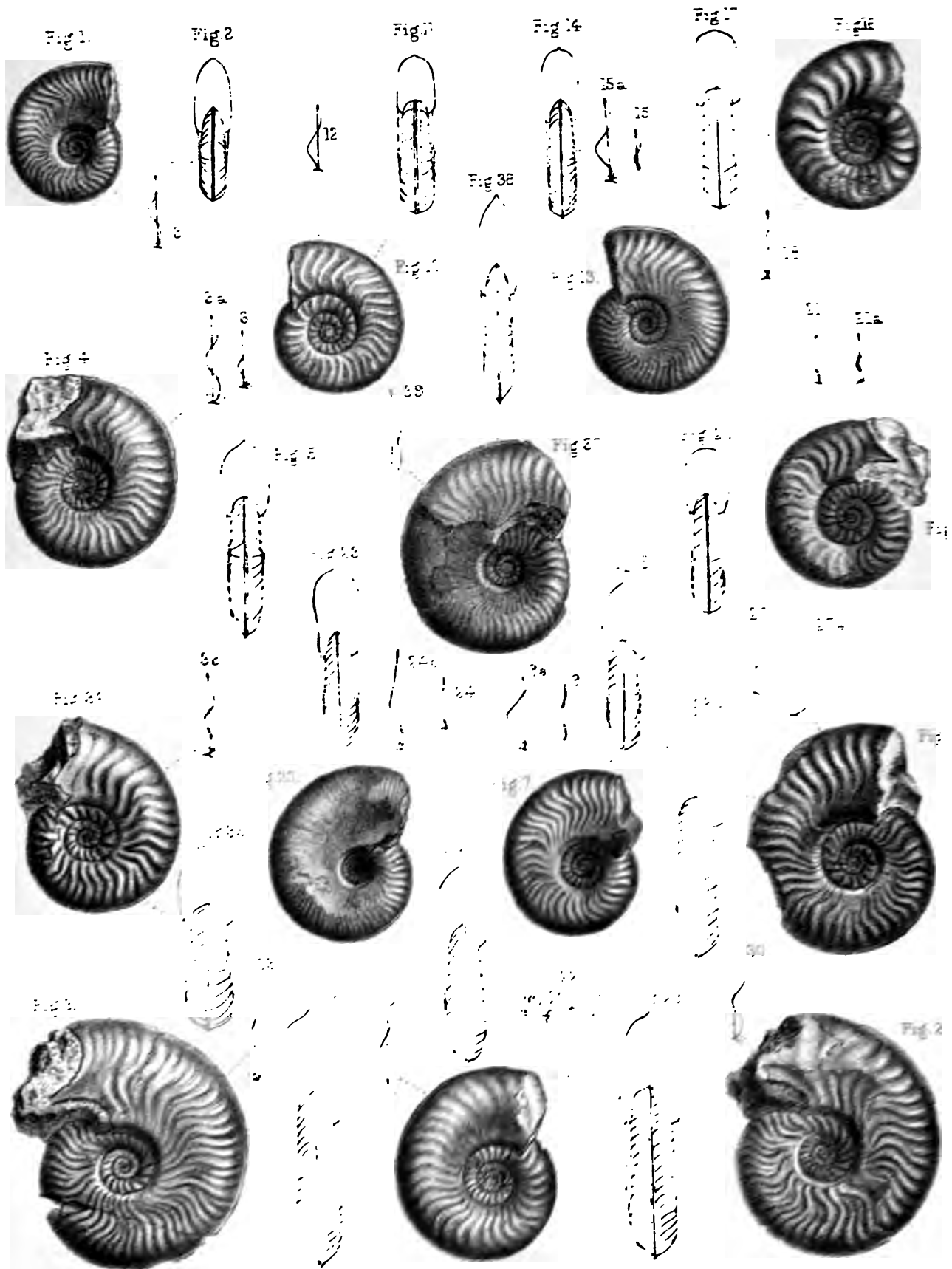
Figs. 34—36.—*LUDWIGELLA RUGOSA*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page xc.)

Concavi hemera.

Figs. 37—39.—*LUDWIGELLA TENUIS*, *S. Buckman*.
Stoke Knap, "Building Stone." (Page lxxxvii.)

Discitæ hemera.

Figs. 40—42.—*REYNESIA AMENA*, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page ciii.)



SUPPLEMENT, PLATE XXI.

Discitæ hemera.

Figs. 1—3a.—*ÆDANIA FALCIGERA*, S. Buckman.
Bradford Abbas, "Fossil Bed." (Page cviii.)

Figs. 4—6.—*ÆDANIA LEPTA*, S. Buckman.
Bradford Abbas, "Fossil Bed." (Page cviii.)

Figs. 7—9a.—*ÆDANIA PARVICOSTATA*, S. Buckman.
Dundry [limestone and marl beds], from the late Mr. E. Wilson, F.G.S.
(Page cviii.)

Figs. 10—12.—*ÆDANIA DELICATA*, S. Buckman.
Bradford Abbas, "Fossil Bed." (Page cviii.)

Figs. 13—15.—*ÆDANIA INFLATA*, S. Buckman.
Bradford Abbas, "Fossil Bed." (Page cviii.)

Figs. 16—18.—*LOPADOCERAS FURCATUM*, S. Buckman.
Stoke Knap (Dorset), "Building Stone." (Page cxii.) Front view not stout enough.

Figs. 19—21.—*LOPADOCERAS ARCUATUM*, S. Buckman.
Stoke Knap, "Building Stone." (Page cxii.)

Figs. 22—24.—*LOPADOCERAS EUIDES*, S. Buckman.
Stoke Knap, "Building Stone." (Page cxii.)

Figs. 25—27.—*HUGIA CURVA*, S. Buckman.
Bradford Abbas, "Fossil Bed." (Page cxi.)

(See Suppl. Pl. XVIII, figs. 19—21.)
Figs. 28—30.—*HUGIA MICCA*, S. Buckman.

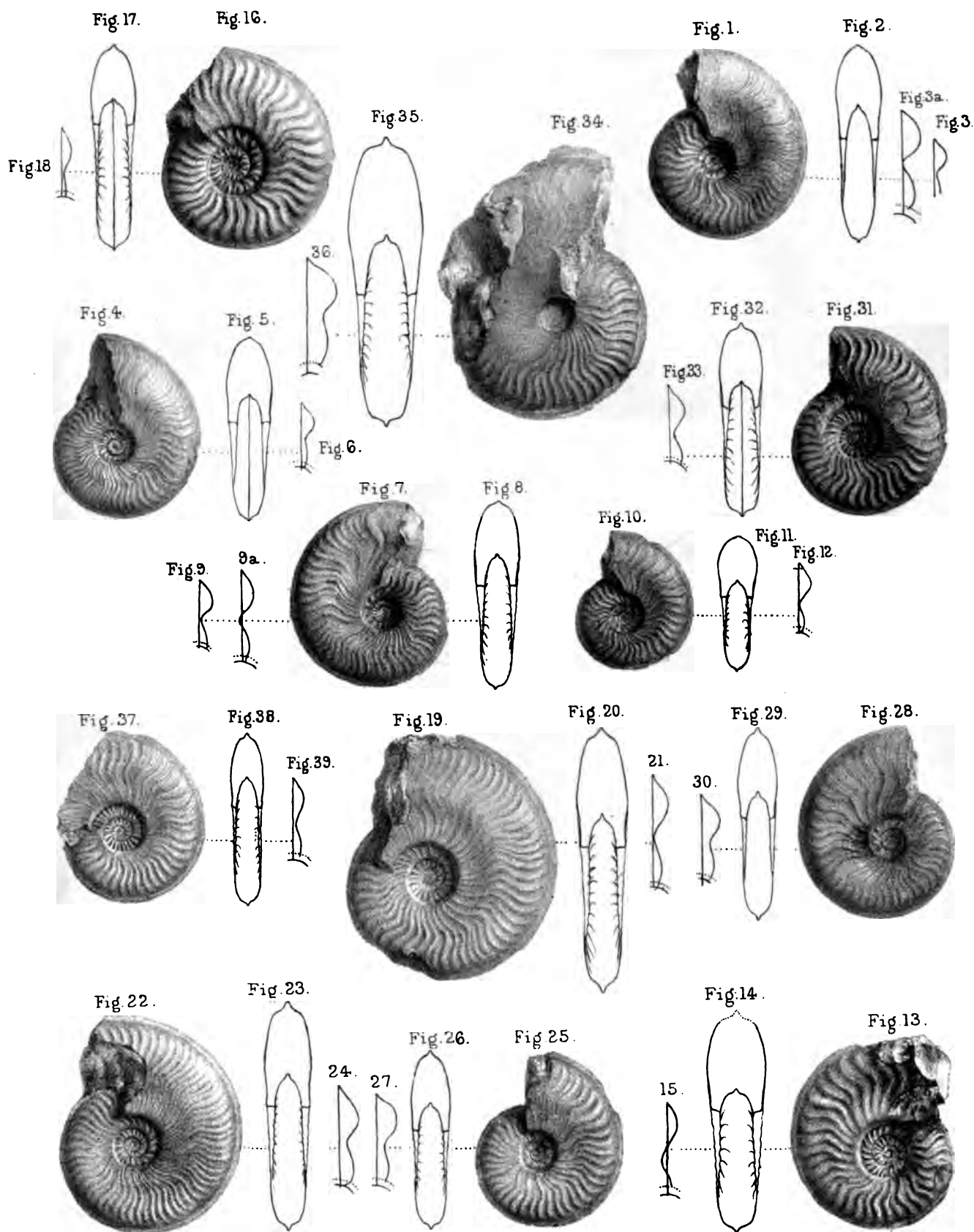
Bradford Abbas, "Fossil Bed." (Page cxi.)

Figs. 31—33.—*TOXOLIOCERAS INCISUM*, S. Buckman.
Bradford Abbas, "Fossil Bed." Collection of Mr. Darell Stephen
(Page cxxvi.)

Figs. 34—36.—*HYPERLIOCERAS? OCCLUSUM*, S. Buckman.

Bradford Abbas, "Fossil Bed." (Page cxxv.)

Figs. 37—39.—*REYNESELLA INOPS*, S. Buckman.
"Building Stone." (Page cx.)



10

SUPPLEMENT, PLATE XXII.

Discitæ hemera.

Figs. 1—3.—REYNESIA FURCILLATA, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page civ.)

Figs. 4—6.—DARELLINA ? DOCILIS, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page cvii.)

Figs. 7—9.—DARELLINA PLANARIS, *S. Buckman*.
Bradford Abbas, "Fossil Bed." (Page cvi.)
(See Suppl. Plate XVII, figs. 22—24.)

Figs. 10—12.—REYNESIA BENIGNA, *S. Buckman*.
Bradford Abbas, "Fossil Bed." Collection of Mr. Darell Stephens, F.G.S.
(Page cv.)

Figs. 13—15.—STOKEIA MARMOREA, *S. Buckman*.
Stoke Knap, "Building Stone." (Page cxxviii.)

Opaliniformis hemera.

Figs. 16—18.—CANAVARELLA ? TOMA, *S. Buckman*.
Buckholt Wood (Frocester), Gloucester. Top of the "Cephalopod Bed."
(Page cxxix.)

Figs. 19—21.—CANAVARELLA ? SCELETA, *S. Buckman*.
Burton Bradstock [Bridport sands and ? near the top]. Collection of Mr. D.
Stephens, F.G.S. (Page cxxix.)

Scissi hemera.

Figs. 22—24.—CANAVARELLA BELOPHORA, *S. Buckman*.
Stoke Knap. Sandy Grits with *Terebratula infraoolithica*. (Page cxxix.)

Dumortieria hemera.

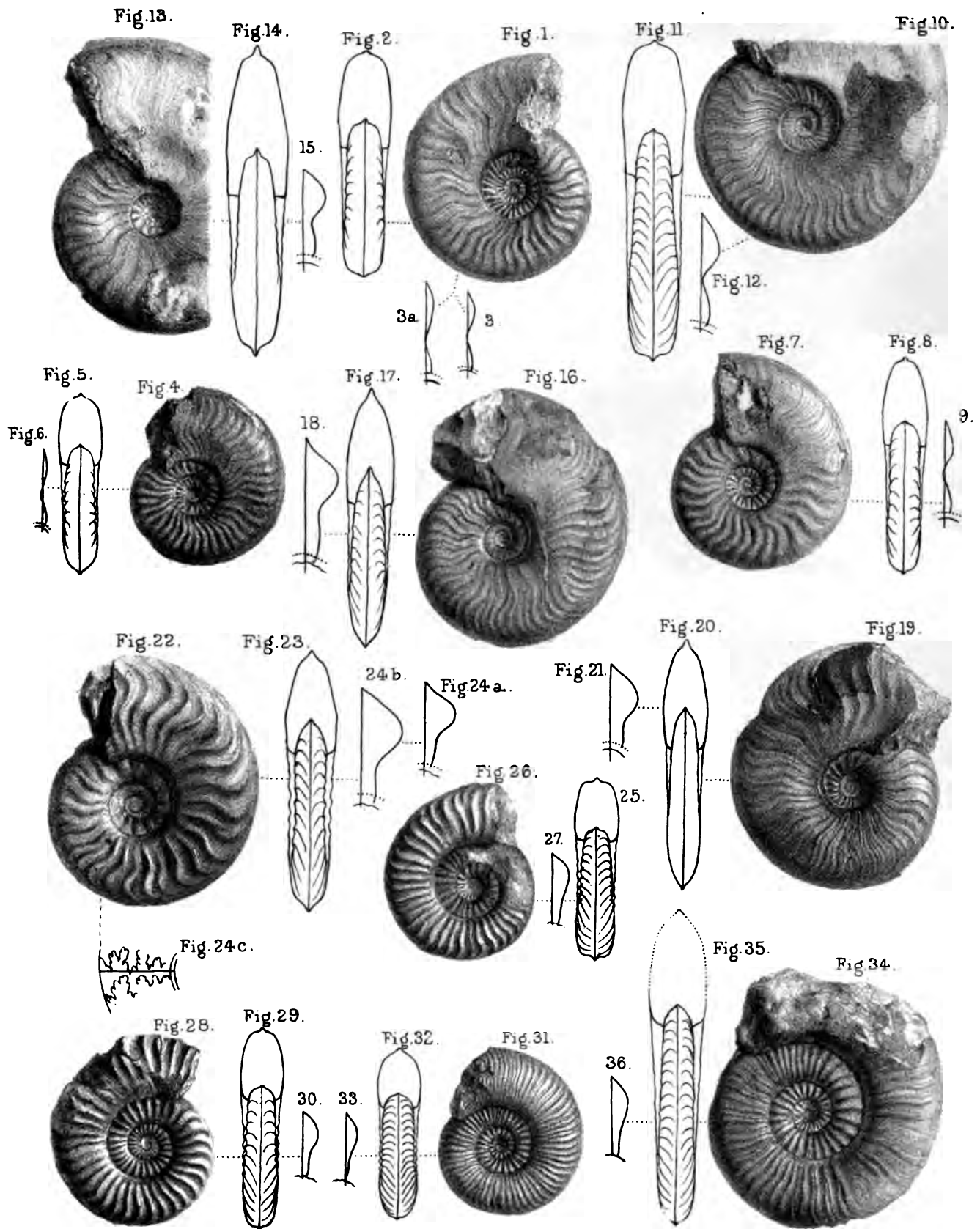
Figs. 25—27.—DUMORTIERIA TABULATA, *S. Buckman*.
Penn Wood (Stroud), Gloucestershire. From the late Mr. E. Wilson, F.G.S.
"Cephalopod Bed," *Dumortieria* horizon. (Page clxxxv.)

Figs. 28—30.—DUMORTIERIA EXPLANATA, *S. Buckman*.
Penn Wood (Stroud), "Cephalopod Bed." *Dumortieria* horizon. (Page
clxxxv.)

Figs. 31—33.—DUMORTIERIA RADIAN (Reinecke).
Penn Wood (Stroud), "Cephalopod Bed." *Dumortieria* horizon. (Page
clxxxix.)

Moorei hemera.

Figs. 34—36.—DUMORTIERIA ARENARIA, *S. Buckman*.
Bradford Abbas, Dorset, "Shelly Beds" of Yeovil Sands. (Page clxxxv.)



SUPPLEMENT, PLATE XXIII.

Moorei hemera.

Figs. 1—3 *a*.—COTTESWOLDIA PAUCICOSTATA, *S. Buckman*.

Fig. 1.—Side view of a fine specimen with test and body-chamber. (Page cxxxiii.)

Fig. 2.—Front view, outline. The periphery where it leaves the overlapping whorl and at bottom should be more fastigate, and at the top more rounded.

Fig. 3.—Suture-line. Fig. 3 *a*. Radial curve.

Figs. 5—7.—COTTESWOLDIA PARTICOSTATA, *S. Buckman*.

Fig. 5.—Side view, with test and complete body-chamber. (Page cxxxiii.)

Fig. 6.—Front view, outline. The periphery should be more rounded at top, the carina being almost obsolete.

Figs. 7, 7 *a*.—Radial curves.

Figs. 9—11.—COTTESWOLDIA EGENA, *S. Buckman*.

Fig. 9.—Side view of specimen with test and complete body-chamber, the border with lateral lappet. (Page cxxxiv.)

Fig. 10.—Front view, outline.

Fig. 11.—Radial curve.

Figs. 12—14.—COTTESWOLDIA ATTRITA, *S. Buckman*.

Fig. 12.—Side view, with test and the body-chamber almost complete. The costæ are rather too definite and distinct. (Page cxxxiv.)

Fig. 13.—Front view, outline.

Fig. 14.—Radial curve.

The above specimens were collected by myself from the *Moorei*-beds, a subdivision of the Cotteswold Cephalopod Bed, Buckholt Wood, near Frocester, Gloucestershire. For figures of allied species see Pls. XXX—XXXIII.

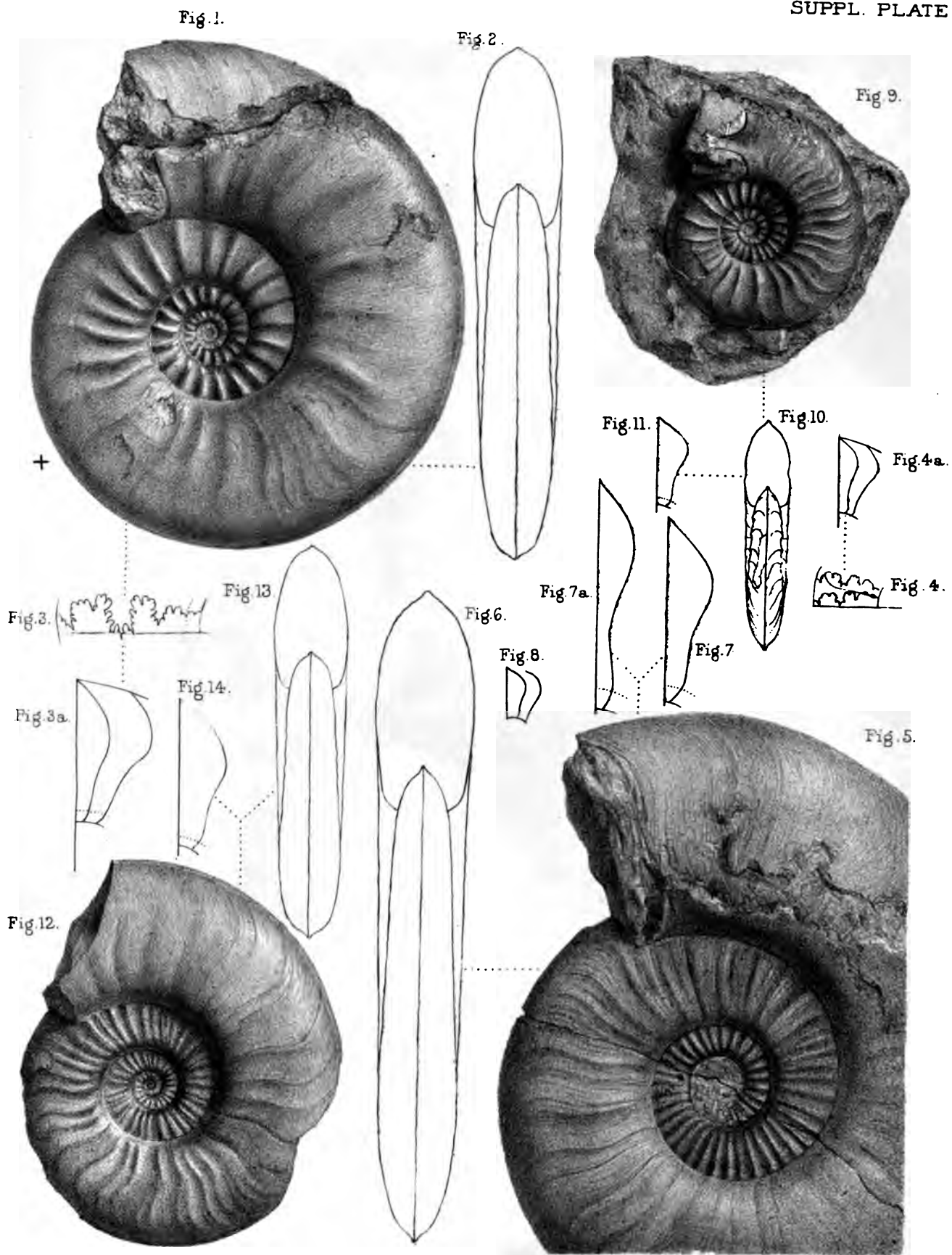
Figs. 4, 8.—Suture- and radial-lines.

Figs. 4, 4 *a*.—COTTESWOLDIA COSTULATA (*Zieten*).

Fig. 4.—Suture-lines. 4 *a*. Radial-lines of the specimen figured in Pl. XXXIII, figs. 3, 4 as *Grammoceras costulatum*. (Page cxxxiii.)

Fig. 8.—COTTESWOLDIA DISTANS (*S. Buckman*).

Fig. 8.—Radial-lines of the specimen figured in Pl. XXXIII, fig. 12, *Grammoceras distans*. (Page cxxxvi.)



X

SUPPLEMENT, PLATE XXIV.

Discitæ hemera.

Figs. 1—4.—FONTANNESIA BOWERI (*J. Buckman*).

Fig. 1.—Side view of the type specimen refigured. From a heap of stones on the roadside, Babylon Hill (Anbury Quarry), Bradford Abbas, Dorset. Collected by the late Mr. Frank Monk, and kindly lent by his father to be figured in this work. The specimen is now in the British Museum—Natural History. (Page cxc.)

Fig. 2.—The lateral auricle of the other side.

Fig. 3.—Apertural view.

Fig. 4.—Peripheral view.

Concavi or Discitæ hemera.

Figs. 5, 6.—FONTANNESIA CONCENTRICA, *S. Buckman*.

Fig. 5.—Side view, showing lateral auricle. Louse Hill, Halfway House (Compton), Dorset. (Page cxci.)

Fig. 6.—Peripheral view.

Fig. 7.—FONTANNESIA AURITA, *S. Buckman*.

Fig. 7.—Side view, showing large auricle. Halfway House (Compton), Dorset. Collected by Mr. D. Stephens, F.G.S. (Page cxc.)

Discitæ hemera.

Figs. 8—11.—FONTANNESIA OBRUTA, *S. Buckman*.

Fig. 8.—Side view of a wholly septate example. "Fossil Bed," Bradford Abbas, Dorset. Collected by Mr. Stephens. (Page clxxxix.)

Fig. 9.—Front view.

Figs. 10, 11.—Two suture lines—one to supplement the other. Fig. 11 is about the fifth line beyond fig. 10.

(For figures of allied species see Plates XLVI, XLVII, LXV.)

Fig. 3.



Fig. 1.



Fig. 2.



Fig. 4.



Fig. 6.



Fig. 5.



Fig. 7.

Fig. 11.

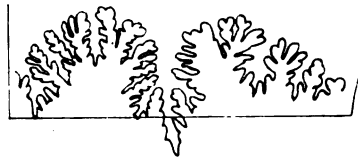


Fig. 10.

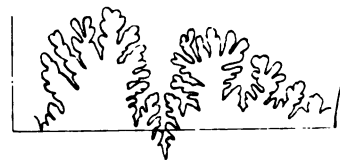


Fig. 9.



Fig. 8.



.

.

.

.

.

.

.



